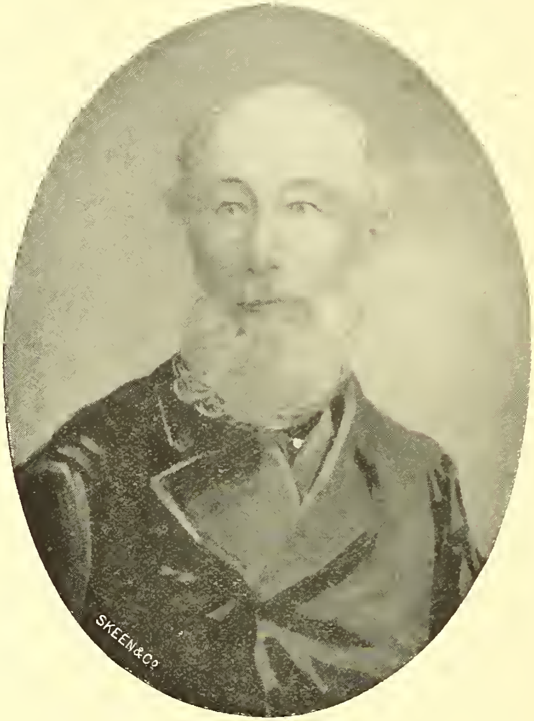

R. E. LEWIS.

Photo and Half-Tone Block by W. L. H. Skeen & Co., Colombo and Kandy.

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"PIONEERS OF THE PLANTNG ENTERPRISE IN CEYLON."

(Third Series.)

R. E. LEWIS:

MERCHANT, PLANTER AND EDITOR, 1841-1870.

MR. R. E. LEWIS deserves a place in our roll of pioneers if for no other reason than that, so far as we can recollect, he was the writer of the first little history of systematic "Coffee Planting," ever published in Ceylon. But Mr. Lewis has special claims arising out of his arrival at an early date in the Colony and to his interest in its development, not only as merchant, but also as planter and editor. He is now a veteran of 82 years in retirement in England, but, like so many other old pioneers, is still active, both mentally and physically, as may be judged by the following little note which reached us by a mail in July last from our old friend:—

"You will be glad to know that in my 82nd year I am in good health though not without infirmities; still active and energetic, for which I cannot be too thankful, still enabling me to make walking excursions into the country by the help of railways, for which the position of my residence offers great facilities, not only for all the Southern lines, but also several of the Northern. These excursions afford healthful changes of air and exercise. My oldest Ceylon friend, Mr. Robert Nicol (A. & R. Crowe & Co.), passenger with me in the 'Achilles' to Colombo in 1841, still survives at Bervie, N.B."

We may now proceed to a sketch of Mr. Lewis' career which will be chiefly autobiographic:—

The subject of the following memoir brought with him a nine years' experience of London business, especially in connection with the Colonial Produce Markets of Mincing Lane, and the wholesale trade in that produce in all parts of England and Scotland. The equalisation of the duties on all British-grown coffee persuaded him that Coffee Planting in Ceylon would very soon become a new enterprise for the employment of British capital, and prompted the desire to go out to the Colony to become a planter. By his father's advice, on the score of his youth, his voyage out was postponed until 1841, when it took place in Mr. Tindall's ship, the "Achilles," which arrived at Colombo in October, 1841. At the time of Mr. Lewis' arrival, there were only two vessels in the Colombo roadstead, and both belonged to Mr. Tindall, whose ships carried nine-tenths of the cargo and nearly all the passengers to and from Europe during the early "forties." Mr. Lewis was at once received into the office of his father's friend, Mr. H. I. Albrecht, whom he had known for many years in his connection with the Produce Markets in Mincing Lane. The Colombo business passing through many vicissitudes was known then as Parlett & Co., and ultimately Parlett, O'Halloran & Co., which firm, after the death of Mr. Albrecht,

in later years suspended. The opportunity occurring, Mr. Lewis embraced the offer of the charge of a Coffee Plantation, Hatterebage, in Saffragam, in 1843. This had long been his wish before leaving England. Having noticed the fiscal changes which had equalised the duties on Coffee from the West Indies and the Colonies, he had been confident from the first, that planting in Ceylon by Europeans would soon follow. Here, notwithstanding the intense solitude of the place, a happy three years were passed, 150 acres planted and partially brought into bearing at a reasonable expense. The proprietor, his friend and fellow-passenger by the "Achilles" died, and troubles arising with his representatives, Mr. Lewis' connection with the estate ceased. He was soon called down to Colombo to undertake to bring into shape the accounts of an Agent for Proprietors in Europe, who had bought and carried on many estates at a vast expenditure of capital. This he did not fully accomplish for reasons which need not be stated, and he declined to proceed further with them. At that time 1846-7, a Conveyance Company was projected in order to bring down the coffee crops from Kandyan districts with better dispatch than could then be accomplished by bullock carts, which usually took from five to seven days between Kandy and Colombo. For this it was proposed to establish stations on the road for providing fresh bullocks to draw the loads and to make the journey continuous and not intermittent by the work and rest of the same cattle. A fair salary being offered for a Secretary, Mr. Lewis applied for and obtained it. Outside attendance at meetings of Directors and receiving subscriptions for shares, his first work was to determine the sites of the stations and to negotiate with native owners and Government officials for the land required. Having accomplished this and secured a terminus in Colombo, other business of a more pressing nature having come upon him, he resigned his position with the Company. Mr. Lewis then held the Power of Attorney of a merchant who was leaving for Europe, and contributed some assistance to the "Examiner" newspaper then but lately commenced. This last led to lending his savings to the then proprietor, of which being unable to obtain the repayment for good or for evil, and very unwillingly he had to take over the paper on the return of his merchant friend to Ceylon. This was in the year 1848, and his connection with that paper, of which he was sole Editor, continued until June, 1853, when the "Examiner" was disposed of to three gentlemen now all gone to the majority. The year 1848 was notable for a partial rising of the natives in the Central Province and the means used for suppressing it, which gave rise to a lamentable controversy between the "Examiner" and the *Observer*, which had hardly subsided when Sir George Anderson succeeded Lord Torrington as Governor. The proceedings in Parliament at home were no less stormy; an exhaustive Parliamentary enquiry took place, and many Ceylon officials were removed to other Colonies. The two last acts of the drama being the Court Martial demanded by Major, now Colonel Watson, by which he was acquitted, and another enquiry by two members of the Indian Civil Service with the same charge in connection with his action whilst on duty in the disturbed districts. Before parting with the "Examiner" it may be mentioned that though it did not enjoy a large circulation, it was an authority on mercantile questions, always siding with the new departure, Free Trade then coming forward at home. Many improvements, arising from the Editor's early business experience at home in regard to preparation and packing coffee for shipment, were advocated in its columns, many suggestions for improvements in coffee cultivation were put forward which have borne fruit in later years.

At the Great Exhibition of 1851, Mr. Lewis contributed Models of Buildings and Machinery on Coffee Plantations for which he received a Medal, and the smaller contributions mostly passed through his hands, sent in to the "Examiner" Office.

Leaving Ceylon in November, 1853, he arrived home in the following March in fine health, just as the Fleet was leaving for the Baltic; the Crimean War having broken out during the voyage round Cape. After parting with the "Examiner," on his passage to England round the Cape in the "Symmetry" in 1853, Mr. Lewis, besides other things amused himself with writing a short "History of Coffee Planting" and the *modus operandi* which after his return to Ceylon was published in chapters in the "Examiner," and afterwards gathered into a pamphlet for distribution to his friends. This little work was used and favourably acknowledged by Sir Emerson Tennent in his great work on Ceylon. Later it was plagiarised by several writers on the same subject, whose names and works need not be mentioned. It is only fair to say, that an ampler historical account of the commencement and progress of Coffee Planting in the various districts, was published by Mr. A. M. Ferguson in his Ceylon Commonplace Book in 1859. Having married, he returned to Ceylon arriving in September, 1855, ostensibly to undertake the management of a plantation in Dimbula; but the arrangement falling through, at the invitation of his old friend, Mr. Butler, he became assistant to, and holding the Power of Attorney of, Messrs. Darley, Butler & Co., which power he was called upon to

exercise to the full during the absence of both partners in Europe. In the same year in conjunction with the late Mr. S. T. Richmond he was appointed Assignee in the Bankruptcy of Messrs. James Swan & Co. In 1861, Mr. Darley, then resident partner in Colombo, going home, not intending to return, and Mr. Stephen Darley coming from Cochin to Colombo, as partner in conjunction with Mr. Mitchell, who had recently joined the firm, Mr. Lewis moved with his family to India to the vacant Cochin post, which he held, after good success in which he participated, until 1866, when the firm gave up business at Cochin. After visiting the Travancore Coffee Plantations, Madras, Colombo, and Bombay, on his way, he rejoined his family at home in the same year. Not seeing his way to enter business in England, Mr. Lewis, at the instance of the partners in London, returned to Ceylon as assistant to Mr. Mitchell, at that time Mr. Stephen Darley had retired from the firm. The death of the elder Mr. Darley in 1869, obliging Mr. Mitchell's absence from Ceylon, during which Mr. Lewis took charge of the business, also brought about changes which made an opening for Mr. Lewis' retirement, then necessitated by the state of his health which had broken down, Mr. and Mrs. Lewis leaving Ceylon and their many friends in November of 1870, after twenty-nine years connection with the island.

Before closing, we may take over a contribution made by Mr. Lewis some four years ago to the *Ceylon Observer*, giving some recollections of his early days in Ceylon :—

The writer's recollections commence in

THE YEAR 1841,

when Sir Colin Campbell was Governor of Ceylon. It was then ceasing to be merely a military dependency of the British Crown, but was becoming a Colony, while Mercantile and Planting enterprise were beginning to develop. It is not intended to give a history of these enterprises, but something may be said as to the causes for this change. In a word, it was the abolition of differential duties on coffee, which had been imposed on the produce of Foreign Countries and even on that of our own possessions in favor of the West Indies.

In these days, when few middle-class families have not some friend or relation connected with the Island, it may sound strange, that Ceylon in the "Forties" was very often confounded with Sierra Leone, and intending voyages were sympathised with as going out to one of the most unhealthy countries in the world.

As nearly as 1837—perhaps earlier—some few plantations had been commenced ; the Governor Sir Edward Barnes had himself opened land near Peradeniya, rendered possible by the opening of the road to Kandy under his energetic rule.

PLANTING

was very experimental in those days, and much capital was wasted by planting in unsuitable situations. The great rush for land however began in 1841, and land was then readily sold by the Government at 5s an acre, as a reference to the *Government Gazette* for that year will show. Unhappily much land was bought and planting commenced by Civil Servants and Military men and much disaster followed leading to regulations which have lately been revised prohibiting such investments. Experience in cultivation and finance had to be acquired, wanting which many proprietors were ruined, and by the year 1847 few estates remained in the hands of the original owners. Experience at last came,—not a little assisted by the local press, through which every improvement became common property, producing valuable discusssion. Wave after wave of alternate prosperity and depression have characterised the enterprise up to the time when Coffee had to give place to Tea.

In those early days the

SOCIETY

outside the Civil and Military offices was very limited. A few merchants had officers in the Fort where their assistants mostly lived to protect the hard cash in the strong room ; no Bank having been established until 1841, when the "Bank of Ceylon" was opened. There was no decent hotel in those times : the Colombo Resthouse would now be a disgrace to an outstation ; but there was much hospitality to strangers, and Captains of ships were always entertained by the merchants, to whom their vessels were consigned. Admission to the use of the Library with the privilege of attending the dances every fortnight, was by ballot. There were then two Regiments of Royal Troops besides the Ceylon Rifles, Artillery and Gun Lascars. Not long before there had been

FOUR REGIMENTS,

stationed in the island. With the influx of new people, houses and furniture were wanted, and except old Dutch furniture in the houses of Burghers,—often very handsome and made of valuable woods,--there was little to be had, except a few articles manufactured outside and brought in for sale on pingoes chiefly. It was not an uncommon thing for somebody to say to another about to leave the Island :—" I am sorry you are going away,

HAVE YOU ANY FURNITURE TO SELL ? "

Not only furniture, but gentlemen's and ladies' clothing articles were difficult to obtain beyond plain things which could be made by local tailors and needlewomen. The writer not knowing what head covering might be worn, brought out with him a silk hat costing 6s 8d which was admired by all beholders : many were the enquiries "Where did you get your hat ? " At that time the Colonial Secretary was wearing a beaver, the color of a fox's brush. Soon after, things changed by a curious circumstance. A new Chief Justice came out, and in his train a Scotch gentleman, who practised as a notary afterwards, and later on as a magistrate at an outstation. His wife, with an eye to the main chance, brought with her an invoice of ladies' goods which were sold off at once. This lady saw at a glance the nakedness of the land, and having a brother in the drapery trade communicated her views to him, which resulted in the establishment of

A GENERAL STORE

of high character and which celebrated its jubilee only lately. Retail busioess by Europeans has since progressed largely in all its branches. One of the most pressing wants at that time was

ROADS IN THE INTERIOR.

The Kandy, the Kurunegala, the Galle, the Gampola, the Negombo, the Puttalam and the Matale roads alone existed. Estates which did not adjoin these roads were reached at best by bridlepaths, but most often by a mere track through jungle over rock and river which caused those clever and sure-footed Pegu ponies to be in great request,—rice and stores reaching the estates by coolies and tavalam bullocks. The facilities for locomotion now enjoyed independently of railways, are chiefly due to the late Major Skinner and his able assistant Capt. Evatt and his subordinates. There were then mail coaches (so-called) on the Kandy and Galle roads which started daily at morning gun-fire. Our merchants were few ; the business of coffee curing and shipping had no then come into existence ; nor had the trade i

piece goods and European articles been developed by the circulation of money on the plantations. A merchant leaving for Europe would be always accompanied to the Wharf by his brother merchants. Intercourse with Europeans was then almost entirely by

SAILING SHIPS;

merchandise and produce coming and going in the same way. Mr. Wm. Tindall of London and Scarborough was the owner of nearly all the vessels which traded with Ceylon; their Commanders heing well-known men well received everywhere. Any one who wished to use the Overland Route organised by Waghorn, would go up to Bombay by onr little mail-steamer "Seaforth," going on by Indian Navy steamer to Suez, and thence in a very rongh way across the desert to Cairo and to Alexandria and onwards. Our Overland Mails came in and went out once a month. During the monsoon they were brought down by Dak from Bombay. In the North-East monsoon they came by the Colonial steamer "Seaforth" from Bombay. The arrival of the

ENGLISH MAIL

was a very exciting thing; for it happened mostly that the outward mail had to be despatched in a matter of hours after. Perhaps there is no European now living in Ceylon who remembers the arrival of the mail announcing the birth of H.R.H. the Prince of Wales and the Breach promotion in 1841. On that occasion after the steamer was signalled, Civilians, Military and Mercantile men were at the Wharf awaiting the Captain of the steamer to land. When he came, he announced to the recipients themselves their new honours. That gentleman after a prosperous career as a merchant in Colombo is now at a good old age, living near London. The passage of the mail was then abont a month—possibly more—for when Capt. Ingledew, the Pioneer of the P. & O. Company, brought letters to Galle in the steamer "India" in 30 days, it was considered a great feat. Since that time the large and powerful steamers of the P. & O. and British India Company, besides many other modern lines, with the opening of the Suez Canal, have rednoed the time occupied in transit and expenses of travelling to abont half of what they were up to as late as 1871. Postal facilities of all kinds now exist which were undreamed of in the 40's, 50's and 60's. The early planters had among other difficulties, that of

FETCHING THEIR MONEY

in hard cash up to the estates which generally required a personal visit every month to Kandy. The provision of this money was by Government notes cashed at the Kandy Kachcheri. Considering the temptation to highway robbery and the facilities for it in lonely corners, it speaks well for the natives, that the number of these crimes might have been counted on the fingers of one hand. A greater trial to the planter was

THE LABOUR QUESTION

especially for clearing jungles for which Sinhalese villagers are specially adapted; those were not the days of contractors for felling and burning, and the immigration of Tamils for all the after operations had not been systematised.

AMUSEMENTS

were few, Governor's Balls, Race Balls and dinner parties in Colombo were abont all. In the Planting districts perhaps the monthly visit to Kandy where the pioneer enjoyed himself very much like Jack ashore, was a beneficial change which the circumstances of his life required. It might then have been said,

"The sound of the church-going bell
These valleys and rocks never heard."

There were Chaplaincies in Colombo, Kandy, Galle and Trincomalee; Missionaries both Church, Presbyterians and Nonconformists at several stations with Churches and Chapels in Colombo and Kandy, but the privileges of public worship whic dwellers in the jungle now enjoy, though these might be improved and extended, did not exist. The most important improvement, and the cause of the great contrast between the present and earlier times has been the introduction of

RAILWAYS.

The facile commnnication hetween the Plains and the Hills is a boon to the health of Enropeans, whilst it is an enormous advantage to the Planting Interest, on the prosperity of which, as seen hy its ups and downs in sixty years, the well-being of the island depends.—R. E. L.

PHILIPPINE HEMP INDUSTRY.

Among the chief industries in the Philippine Islands is the gathering and export of Hemp. Manila hemp is known the world over for its fine qnality and its value for making all kinds of rope, from the biggest hawser down to the finest piece of twine, and it would be very mnch in order to devote a little of our space to this important featnre of Manila's commerce.

The scientific name of this hemp is "Musa Textilis," and the tree belongs to the banana family; thns the banana is classified as "Mnsa Edibilis," the latter names of each respectively showing one to prodnce the textile or fabric, and the other the edihle frnit.

"Manila hemp" is the name invariably used hy the merchants of England and America to distinguish it from the Russian an Indian hemp, which is mnch inferior. In the Philippines, however, it is not regarded as a product of Manila and district, bnt chiefly of the sonthern islands, and it is called "abaca," with accent on the last syllable.

The hemp trees of the Philippines, have been tried to be introduced in Borneo and India bnt withont mnch snccess. The trees grow best on the Pacific slopes of the Southern islands. Sonth Luzon furnishes the best qnality and greatest quantity, but there is little difference hetween Samar and Leyte of the archipelago as prodncing districts. The roots of the plant cannot exist in damp soil; volcanic soil where the ground is dry and plenty of moisture overhead is essential to getting the best resnlts.

Here, in these localities we find large plantations among the hills with the hemp trees in different stages of growth. They require little cnltivation; once a week the native cleaner or gatherer goes through the plantation and does the little weeding that is necessary while in performance of his duty of cutting and stripping the trees.

The trees are planted from shoots and grow to a height of ten feet and from five to seven inches in diameter. In appearance they appear to an unpracticed eye like the banana tree, and if these trees were allowed to grow five or six years they wonld develop a fruit something like a plantain; it is said hy some that this frnit is poisonous.

When the tree is three years, then it is the proper time to cnt it down and strip it of its fibre. This stripping is a most difficult and important point in the production of hemp and reqnires great experience. The native cleaner, as he is called, goes np into the hills armed with his bolo and a hag of rice. He enters the plantation and glances to right and left as he walks along. Experience has tanght him to tell at a glance if a tree has reached the age for cutting. One slash with the holo and the tree is out down close to the roots. The first thing he does is to plant a cutting or shoot in close proximity to where the tree grew. This is invariably the rnle, that when a tree is cnt down another is immediately planted in its place, so there are at all times trees in different stages of development. As soon as this is done he strips the shruh of its leaves and commences on the long stalk eight or ten feet in length: He strips off the extreme outer skin and then commences the real work. In the centre of the stalk is a stout pith, and around this grow alternate layers of fibre and a sappy, vegetable matter. These layers of fibre must be carefully stripped off the stock at once for fear of the sa

rotting the fibre. The cleaner in a couple of minntes has cut a small bamboo tree and made a rough beuch. With a bamboo strip fastened to his knife and that in turn fastened to his foot, he stoops over to the ground in front aud then makes a full backward sweep as far as his arms can reacb stripping a layer of fibre which be throws off to one side. This is repeated until the fibre is all taken off, and after spreading the strippings on the gronnd to dry in the sun he continues on to repeat the work in another spot wherever he may find a tree in the proper stage of maturity. Tbe work of stripping is heart-breaking and causes many a lame back; even the native who is accnstomed to the work finds it no sinecnre. A full tree will yield about one pound of fibre and a native can clean fifty pounds iu a week. The length of fibre is from six to eight feet.

The natives are exceedingly iudependent and work as long as it snits their cenvenience. When a cleaner has got what he considers enough fibre cut, cleaned and dried, he ties it np and takes it down to market, where he sells it to the middleman and receives in return the market, value of the fibre. The plantation owner receives one-half this remuneratiou and the native keeps the other, and tbis is the only time the plantation owner figures in the whole proposition, i.e., when he gets his half. He simply watches to see that he gets his share.

In the hemp ports representatives from the business houses here in Manila buy from those middlemen. They are either Spanish, Chinise or native dealers, who collect the hemp and barter with the native cleaners, nsing rice as the standard of exchange.

GRADES.

Ordinarily, the hemp arrives here classified according to grade by the middlemen, but sometimes it is sent here to be classified and the experienced eye of the merchant spots at once all deffective or injured fibre.

The quality depends a great deal upon the original cleaner and the state of the weather at the time the tree was cut.

To turn ont the best grade the cleaner must be very careful in his stripping and have the fibre dried at once, whereas, if allowed to stand awhile, the fibre losses its fine color aud some of its streugth. Hemp is graded accrding to fineness or coarseness, color, length of fibre aud its tensile strength. The latter depends greatly upon tbe age of the tree. The color and coarseness show the quality of the Hemp and this depends, as mentioned above, wholly upon the cleaner. Sometimes he is careless, and more especially when high prices prevail in Manila he does not trouble himself about the quality of his work, but aims only to turn out as much as possible while that market condition prevails.

VALUE.

The value of hemp varies. It has been known to be as high as £60 per tou aud then again as low as £14 sterling. Of late the price has fluctated contiually, owing to tbe war and the political situation in the Philippines. The average rate per ton, however, is about £25 or £30 sterliug.

There are between 800,000 and 1,000,000 bales of hemp produced and shipped from these islands annually. The United States, acting as a ceutre for South America, Cuba and canada,; and England; as a centre for Europe and Western Asia take the bulk of the trade in about even quantities.

Tbe hales are packed by both hand and steam presses and weigh about 28 pounds each. They are thns conveniently handled. About half a dozen of the shipping houses here do the bulk of the export trade and, perhaps, forty steamers are utilized in the carrying of rice to the ports and a return cargo of hemp to Manila.

The handling of the business requires years of experience and a long residence in the conntry, to be successful in coping with the business methods of the wily Asitic, both Chinese and Filipino.

We all remember how in visiting the owner of an orchard he takes us through his fruit preserves and can tell every grade and species of apple tree. They appear to the uupractised eye to be all apple trees. It is the same with the hemp plantation. There are great varieties of hemp aud the native showing a visitor through tho groves points out the different grades of trees, giving its native name and weatber the qnality is better or inferior to the ordinary.

There are all residents here in Manila, foreign as well as native, who from long experience in handing hemp, can tell at a glance just which ports certain bales of bemp have come from. It is indeed a great business and cannot hs learned in a day.

From the outer layer of a properly matnred tree comes the finest of fibre, and if this is carefully cleaued and dried, it is sometimes used by the natives to weave into cloth. They mix it with silk and make a sort of Indian muslin, in fact it makes tbe finest of hemp cloth. Some of the natives in tbe hemp growing district make coarse cloth to wear while others make fishing nets, the fibre being exceptionally good for this pnrpose as it is so strong.—*Manila Times* July 28th.

CONNECTION BETWEEN THE ROOTS AND LEAVES OF PALMS.

I am sending you some samples of Sago Palm (Bot *Caryota urens:* Telugu, "Bakinimanu," Uriya, "Solopo") collected from the Nallamalai Hills iu the Kurnool District, where the species grows in great profusion in damp localities, covering tbe soil with a regular carpet of seedling. From these specimens several points may be noticed. First: when one leaf is developed there is one root; when two leaves are developed there are two roots, aud generally when three leaves are developed there are three roots, but sometimes more. There seems, therefore, to be a very iutimate connectiou between the number of roots and number of leaves developed; it may be that, where the number of roots exceeds the number of leaves developed, more new leaves are developing. I send also (but regret it has been much damaged) a specimen of grass which has, or has had, 28 leaves developed and has 28 main roots; whetber this is merely a coincidence I cannot say.

I send also a portion of a *Caryota* stem, from which I have cut the leaves just above where they separate from the stem. Each leaf completely surrounds the stem at the base of the petiole; in the samples of leaf sheatbs herewith sent, I was obliged to cut the net-work of fibres, which was continuous all round the stem for from 2 to 4 feet in length, so as to take the leaf off the stem. One leaf is developed at each node, and between the nodes the petiolo of the leaf forms part and parcel of the stem. In the Kistna District I found that 3 leaves were developed at each node in the Palmyra (*Borassus flabelliformis*) and in the date (*Phœnix sylvestris*) even a greater number seem to be produced (I hope to investigate the date more carefully next month).

The stem of the *Caryota*, thus deprived of leaves, resembles a drawn-out telescope, the object glass of which is at the roots, and the eye-piece points upwards.

Referring again to the seedlings, it will be seen that the first root almost resembles the tap root of an exogen, but that the monocotyledonous formation is so distinct. The collum in the dicotyledon is an indefinite point between the cotyledons; in this, what corresponds to the collum (which term, though not Botanically correct in this case, I shall adopt) is a most distinct point. There is not the slightest doubt that at this point, the fibro-vascular expansion from the seed, the root, the first leaf and its sheath diverge. When the second root forms, it develops higher up than this collum point, and immediately below the sheath of the first leaf. The first leaf develops between its sheath, almost surronnded by it, and the fibro-vascnlar expansion from the seed, and is, therefore, in the middle of the plant. When

the second leaf appears, the seed and its expansion have dropped off, and it comes from the base of the petiole of the first leaf, which forms a sheath for the second leaf, and between the first leaf and the sheath of the first leaf. It thrusts the first leaf out of the central part and takes the centre of the plant itself. The third leaf acts in the same way to the second leaf, and the fourth to the third leaf, and so on, just as the second did to the first. The third root forms just below the first leaf, the fourth root below the second, and so on, the roots getting gradually higher and higher up above the collum point the later they develop. There seems to be a centrifugal tendency about these roots. This can be further observed from the fact that young palms have none of their roots above ground surface level; but, the older they become, the more such roots above ground appear; and in bamboos sometimes they are seen springing from the lowest two or three nodes above ground level, when the rhizome is fully crowded out. The same is seen in *Caryota* and *Borassus*, but ordinarily the nodes are not so distinct, and they seen to come out between the nodes.

Endogenous growth of wood is generally said to consist of a cellular tissue in the centre with a compact net-work of fibro-vascular bundles outside it, forming a rind. It was generally supposed that these fibro-vascular bundles came from the outside of the rhizome, passed in towards the centre of the stem, and passed outwards again towards the rind and into the leaves. A celebrated botanist (French, I think,) whose name I cannot just now recall, took exception to this, as it was found that tracing some of the fibro-vascular bundles back from the leaf they passed towards the centre of the stem, then came back to the rind considerably higher up than the rhizome. I think an investigation of these specimens will explain the matter. The fibro-vascular expansion from the seed forms the fibro-vascular bundles of the first root; those of the first root form those of the first leaf and sheath, those of the sheath form those of the second root and those of the first leaf from those of the third root; and so the bundles are formed in succession from root to leaf and from leaf to root. In the mean time cellular tissue is being formed in the centre of the plant, kept there and prevented from expanding much outwards by the fibro-vascular tissue. As each leaf develops it takes the centre of the plant, forms a small portion of stem (between the nodes), and is then pushed on one side by the next leaf. As each root develops it takes a position more and more away from the centre, and higher and higher up the stem; but it must be remembered that above ground it cannot come out of the stem, *i.e*, it must lie dormant until the sheaths of the leaves have fallen away from the stem. As the tree develops the fibro-vascular bundles have to pass from the side of the root (*i.e.* not the centre) to the centre of the stem when the leaf develops at the top and centre of the stem, and is pushed back to the side of the stem by the development of the fresh leaves; and the more the stem increases inside, the greater will be the curve of the fibro-vascular bundles, until it is flattened by other bundles coming inside it.

It does not necessarily followed that, because the fibro-vascular bundle has to pass to its root, that it necessarily passes to the bottom of the tree; for the roots appear on the tree higher and higher up the stem, as the tree becomes older; and there must be many dormant roots which have been prevented from coming to the surface by the persistent sheaths of old leaves.

It seems rather curious that weight is attached to the difference in growth between endogenous palms and acrogenous Tree Ferns; for the difference seems merely in degree. Both consist of cellular interior tissue, with fibro-vascular exterior tissue; in the case of palms the fibro-vascular tissue from a leaf appears to descend to form a root before forming another leaf, whilst in the case of tree ferns it appears to ascend direct to form the next leaf. The rind of endogenous is consequently far stronger and more continuous. The term acrogenous, too, seems to be misleading, for in the endogenous palms, each leaf comes to the central summit before being pushed aside by a new leaf; the same happens with the Tree Ferns.

A. W. Lushington.

PROFITABLE TOBACCO GROWING.

By R. S. Nevill, Tobacco Expert.

To the question, "Is the growing of heavy export tobaccos profitable, or can Queensland growers compete with other countries in other markets?" the answer is—Yes, if the farmers are willing to adopt modern methods, and conduct their farming operations upon lines followed by other agricultural communities. Not only that, but they can practically monopolise the market for this class of tobacco in these colonies, as it is conceded that, so far, this colony gives promise of being able to produce the best tobacco grown in Australia. Given the soil and a sufficent rainfall, the cost of production in this colony should be less than it is in the United States, for the following reasons:—The Queensland farmer does not require to feed his working stock through a long hard winter, his taxes are little more than half those imposed on the farmer in the United States, and he gets a larger yield than the latter, while the price of a labour is about the same.

Ordinarly, the amount of tobacco produced here is not commensurate with the labour performed, and for the reason that the labour is often not properly directed.

It is doubtful if any one crop, to the exclusion of all others can be made profitable one year with another, employing only one-third or one-half of a man's time, and the balance idle or doing wage work when he can get it. By diversifying the crops of the farm, and making tobacco one of the crops, the farmer does not then depend upon the one crop for the whole of his income and sustenance, and he is sure to get a good price for one or more of his products, besides producing his own food, which he can do cheaper than he can buy it out of his tobacco money.

METHODS.

It goes without saying that the one-crop system requires a higher average of prices to be profitable than that of several crops. By diversifying their crops, the farmers of the United States have found tobacco-growing fairly profitable at 3½d. per lb.

The cost of production in Queensland can be materially lessened by substituting the plough tor the hoe, as I have heretofore suggested—a process which will increase the quantity and improve the quality. Improved curing-sheds and improved methods of curing will also give additional weight to the tobacco, besides improving its quality. The labour of transplanting can be much lessened by a thorough preparation of the ground beforehand, by deep ploughing and deeper cross-ploughing, and thorough harrowing, and getting the soil into the best of tilth. By this means a proper arrangement of soil particles is obtained, and the land is in the best physical condition, influencing beneficially both the temperature and the moisture; the free access of air is secured, supplying the necessary amount of oxygen, and the soil is in such a condition of fineness as to allow a perfect root development.

These are all essential to healthy plant life; and when these conditions exist, the farmer will have fewer plants dying from transplanting, and the labour will be materially lessened. It should be evident to everyone that the soil in such condition as to supply, fully, all that plant life demands of it, will give the best results in every particular, and this condition cannot be obtained without the free use of the plough.

USE OF THE PLOUGH.

A oloddy soil will certainly defeat all efforts to get a good and uniform stand in the field, and care should be taken to plough the ground when it is in proper condition. A tobacco-field should be ploughed after each hard rain—after tbe ground has sufficiently dried, until the plant is too large. When the plants are kept in a perfectly healthy and vigorous condition, they are less susceptible to disease. Pruning, or taking off the bottom leaves in order to allow ventilation under the plant, is also a condition to healthy fields. The amount of water in the soil to produce the best results for heavy pipe tobaccos is estimated to be from 15 to 20 per cent.

"Below 15 per cent. the line of drought is reached, and the methods of cultivation should have for their prime object the maintenance of the water supply above the line of drought, so that the growth of the plant shall receive no check."—*Whitney*.

PRODUCT.

It is important that growers should take notico of these things, for when they seek an outlet for the surplus product they must offer an article quite as good as others, and one which is produced as cheaply. This cannot be done unless the best methods are a opted—the best are the most economioal.

The appreciation of the necessity of proper methods, and their adoption, will save fully 25 per cent. of labour, besides giving better and increased results.

The various pests of the tobacco plant can be controlled by the use of Paris green, as a spray, but this must not be used after the tobacco has been topped. It is very effective in the case of the Miner.

The lands best suited to growing heavy export or pipe tobaccos are friable and well drained. Limestone soils, with a small percentage of the clay and a large percentage of silt, are the best. Wet or forcing soils will not grow good tobacco, as the product will be rank and woody.

Climate has much to do with the quality, and this can only be determined by experiment. For cigar tobacco sandy soils are preferred, some of the best cigar lands of Florida having 50 per cent. of sand. This is confirmed by Mr. Whitney in his report on the tobacco soils of the United States.—*Queensland Agricultural Journal*.

THE VELVET BEAN.

A few words about the velvet been as a source of forage as well as a renovator of the soil be very opportune, and I would suggest to those who are unaware of the value of this bean to try a small patcy of it and just watch the result. Those who have already grown the bean will bear me out when I say that we have nothing in its own line to equal it. It is a great forage producer, and the grain, both in the green and dry state, in equal to anything grown for food for any stock, and it is not too much to say that everything that walks on four feet is fond of it.

The velvet bean grows and makes a fair crop where cowpeas would scarcely germinate the seed. It is an excellent improver of the soil in that it is the best nitrogen gatherer among all the known legumes. Its foliage is so dense that it shades the land completely during our hot days of summer, and by shedding the leaves nearest the ground it forms a mulch that conserves the ordinary moisture in the soil. In short, we have in the velvet bean what the Southern farmer have so long been looking for, that is, something that will produce a good profitable crop and at the same time help to put backbone into the poor sandy soils of the South.

I have said that it will make a fair crop on land too poor for cow peas, but it will repay its grower for a little commercial fertilizer applied to the soil previous to planting time. Some farmers are sanguine enough to think that there will come a time when commercial fertilizers might be entirely dispensed with. There is no indioation that will ever come; in fact, the tendency is rather the other way, as every year sees a marked increased in the fertilizers used, and every broad-minded, observing farmer knows that for every dollar thus invested he gets back ten and sometimes twenty, according to the intelligence and wisdom exercised in the selection of the proper kind of fertilizer and the method and time of application.

Like every other crop, the velvet bean has a preference, if we may use the term, for a certain kind of food which is best suited to its requirements and which enables it to return the most profitable crops. It wants a fertilizer analyzing high in phosphoric acid and potash. Being a natural nitrogen gatherer, it does not require any nitrogen fed to in the shape of fertilizers. If we cannot get a fertilizer containing no nitrogen, the best way to get over the difficulty is to buy our phosphate and muriate of potash, and prepare our own fertilizer, bringing the analysis as near as possible to ten per cent potash and seven to eight per cent phosphoric acid. Four to six hundred pounds of this per acre, broadcasted and mixed in the soil a short time before planting will pay for itself at least twenty-fold. On poor, worn-out soils it is best to drill in the fertilizer and plant the bean in the drill after it has had a good rain on it.

In preparing the land for this crop the best method in my experience has been to run off furrows about five feet apart and drop a been every ten to fifteen inches; this will give a good stand, and as the crop is a long season one it should be planted as early in the season as possible. Some time in late June or July make a very thin sowing of Giant beggar weed in tho water furrow, this will spring up quickly and be ready just in time for the bean to climb all over it (for the latter undoubtedly does best when it has something on which to climb.) If the bean has been planted early in April, which is really the proper time, a thin sowing of fodder corn in the water furrow in June will answer the purpose as well as beggar weed. This combination will give an exceptionally heavy forage crop, ready to cut in early September, and it will make a good second crop after that which can be allowed to remain in the ground and be ploughed under in the winter to improve the soil and restore its fertility.

If simply grown as a soil renovator it can be planted four feet apart and every two feet in the furrow and allowed to remain where it grows. If wanted for pasture for stock or hog feed, beggar weed, millet, or anything of that kind planted along with it, will prove a decided benefit, as in itself it is somewhat laxative at first in its effect on stock, and other forage mixed with it helps to counteract this effect somewhat.

In cutting to cure for forage is where the real trouble is encountered, as its growth is so enormous, and if it is growing on anything the tangle of vegetation is such that it is a hard matter to get at it well. If cut in the forenoon, after the dew has dried off, and hauled to the barn without delay and spread over poles (I use my tobacco barn for the purpose), it cures excellently and makes the finest cattle forage I ever saw, and I feel confident that it only needs a proper trial by every Southern farmer to secure its general adoption all through the Southern States.

I do not think the velvet bean can be grown north of Kentucky successfully. A friend in Kentucky grew some of it last summer and he reports an extraordinary growth of vine but no gain, the season being too short for it to form seed. He grew it in a field adjoining the turnpike road where a telegraph line ran along. The vines went through the fence and climbed to the very top of the telegraph poles, showing that Kentucky soil is well adapted for the vine—at any rate.—C. K. McQuarrie.—*Planters' Monthly*.

CULTIVATION OF THE COCONUT IN THE PHILIPPINES.

What Every Man Interested in Those Islands Wants to Know.

Coconut plantations pay very well and there is a certain demand for the fruit in China, beside constant local sales in native markets. The uses of the tree are various. Some tap the tree by making an incision in the fruitbearing stalk, under which a bamboo vessel called a bombon is hung to receive the sap. This liquid, known as tuba, is a favorite beverage among the natives. As many as four stalks of the same trunk can be so drained simultaneously without injury to the tree. In the bottom of the bamboo vessel is placed as much as a dessert spoonful of pulverized tong bark, to give a stronger taste and bright color to the tuba. The incision, renewed each time the vessels is replaced, is made with a very sharp knife. The sap drawing of a stalk continues incessantly for about two months, after which it ceases to yield and dries up.

The vessels containing the liquid are removed and empty ones put in their place every twelve hours about sunrise and sunset. If the tuba is allowed to ferment it is not so platable and becomes an intoxicating drink. From the fermented juice the distillers manufacture a spirituous liquor known locally coco wine.

The trees set apart for tuba extraction do not produce nuts, as the fruit forming elements are taken away. The man who gets the tuba has to climb the trunk of the tree, on which *notches are cut to place his toes in.* Occaionally a man falls from the top of trunk 70 or 80 feet high and breaks his neck. The occupation of tuba drawing is one of the most dangerous.

When the tree is allowed to produce fruit instead of yielding tuba the nuts are collected about every four months. They are brought down by either a sickle-shaped knife lashed on to the end of a long pole or by climbing the tree with knife in hand.

When they are collected for oil extraction they are carted on a kind of sleigh, unless there be a river or creek providing a water way, in which latter case they are tied together, stalk to stalk, and floated in a compact mass like a raft upon which the man in charge stands.

The water or milk found inside a coconut is very refreshing to the traveller, and has this advantage over fresh water, that it serves to quench the thirst of a person who is perspiring without doing any harm.

At seven years' growth the coconut palm tree seldom fails to yield an unvarying crop of a score of large nuts monthly. In the provinces of Tayabas, La Laguna Batangas and district of La Infanta the coconut palm is extensively cultivated solely for the purpose of extracting the oil. The coconut oil factories are very rough, primitive establishments, usually consisting of eight or ten posts supporting a nipa palmleaf roof and closed in at all sides with split bamboos. The nuts are heaped for a while to dry and concentrate the oil in the fruit. Then they are chopped mere or less in half.

A man sits on a board with his feet on a treadle from which a rope is passed over and works to and fro a cylindrical block in the end of which is fixed an iron scraper. He picks up the half-nuts one at a time, and applying to the scraper in motion the white fruit falls out into a vessel underneath. These scarpings are then pressed between big blocks of wood to express the oil and the mass is afterwards put into cast-iron cauldrons of Chinese make with water which is allowed to simmer and draw remaining fatty particles off the surface. When cold it is sent off to market in small straight-sided kegs on ponies which carry two kegs—one slung on each side.

Small quantities of coconut oil are shipped from the Philippines. In Europe coconut oil is white and solid and is used in the manufacture of Soap and candles. In the tropics it is seldom seen otherwise than in a liquid state, as it fuses a little above 70 deg Fahr.

In 1891 a coconut oil factory was started in Manila with modern appliances. In the Philippines themselves it is an important article of consumption. Every dwelling, rich or poor, consumes a certain amount of this oil nightly for lighting purposes. It is largely employed as a lubricant for machinery, for which purpose however, it is very inferior. Occasionally also, it is used for a medicinal application.

COPRAH.

It is only in the last few years that coprah has acquired importance as an article of export. In 1890 the total amount exported was 4,653 tons. In 1897 it had reached 50,714 tons, about 85 per cent of it being handled by English firms.

A variety of useful domestic utensils are manufactured by the poorer class of the natives out of the hard shell of the coconut. Also when carbonized the shell gives a black dye, used for dyeing straw hats.

COIR.

Very little use is made of the coir or outer fibrous skin which in other countries serves for the manufacture of coconut matting, coarse brushes, hawers, etc. It is said to rot in fresh water, where as salt water strengthens it. As it floats on water it ought to be of great value to ships. In the Philippines it often serves for cleaning floors and ships' decks when the nut is cut into two equal parts across the grain of the coir covering, and with it a very high polish can be put on to hard woods.

NIPA PALM.

The nipa palm is found in many salt swarmps and flooded marchy lands. It has the appearance of a gigantic fern. The leaves, which are very long and about three to five inches wide, are of immence value in the country for thatched roof. Nipa is not to be found everywhere; one may go many miles without seeing it in the districts devoid of marches and swarmpy low lands.—*Manila Times*, August 21st.

The World's Coffee Trade.—"Coffee Statistics, 1899-1900," by Messrs. C J Leech & Co., of Mincing-lane, contains a mass of statistics relating to the trade of the world in coffee. Much of this information is of value only to those engaged in the trade; but some of the figures are of more general interest. The chief coffee markets are London, Havre, Hamburg, the Dutch ports, Triest, Antwerp, Bordeaux, and Marseilles. The total production during the current year (*i.e.* up to June 30 next) is estimated at 15,285,000 bags of 60 kilogrammes or 132¼ lb. each. Of this over 10½ million bags belonging to Brazil, Santos coming first amongst Brazilian ports with 6,000,000 bags, and Rio next with over 3¾ millions. Mexico and the Central American States come next 1½ milllon bags, then Venezuela and Colombia with 1¼ million; Java supplies 650,000 bags, the West Indies (chiefly Hayti, Cuba and Puertorico) 550,000; British India and Manila, which are classed together, send 300,000 bags, Africa and Arabia 250,000, and the small balance comes from Sumatra, Ceylon and the Eastern Archipelago. During recent years the production has fluctuated considerably; in 1894-95 it was over 11½ million bags; the next year it fell to 10¼ millions; in 1896-97 it rose to over 13½ millions, and in the following year to over 16 millions, while last year it again fell to over 13¼ million bags. The prices show still greater fluctuations. The figures given by Messrs. Leech show how completely the world depends for its coffee on Brazil and how dependent the market prices are on the production there.—London *Times*, August 14.

REMEDIAL MEASURES AND INSECTICIDES.

By E. E. Green, Government Entomologist.

In the following pages I have endeavoured to bring together scattered information on the various methods that have been employed in dealing with insect pests of the family *Coccidæ*. Though such treatment may in many cases be found suitable to insect pests of other families, I do not propose to give here a general treatise on insecticides, but to confine myself to measures applicable to the subject of the present work.

Little or no originality can be claimed for the following remarks. They are very largely compiled from the published work of trained entomologists (chiefly American) in different parts of the world. America has long been in the forefront in the practical application of economic entomology.

Remedial measures may be discussed under two main headings: Prevention and Cure. The former, being by far the more important, will be dealt with first:—

Preventive Measures.

Of first importance amongst preventive measures, I would place Quarantine Regulations. It is a fact, repeatedly demonstrated, that imported pests, are the most serious. An insect may attract little or no attention in its original home, where it is kept in check by its own natural enemies, a system recognised as 'the Balance of Nature.' But take it away from its home; place it in a congenial climate with an ample supply of suitable food, and it will multiply without the checks that have prevented its increase in its original habitat. The very fact of extensive damage by any insect may of itself almost be accepted as proof of its foreign origin. Looking through the list of the different scale-insects occuring in Ceylon, I find that all the more troublesome species have been previously described from some other country, and are, therefore, presumably imported insects. The home of the 'Lantana bug' *(Orthezia insignis)* is now supposed to be some-where in S. America; and there is evidence in favour of the supposition that we owe our 'green coffee bug' *(Lecanium viride)* to Western Africa. *Aspidiotus cydoniæ*, *Chionaspis biclavis*, and *Mytilaspis citricola* were originally described from America. *Aspidiotus camelliæ*, *A. cyanophylli*, *Chionaspis aspidistræ*, and *Dactylopius citri*, are all well known on the continent of Europe. *Aspiodotus aurantii* and *Pulvinaria psidii* have their home in Australia. Our former coffee pest, the 'brown bug' *(Lecanium coffeæ)* might perhaps be quoted as an exception to this rule, as it was first recorded from Ceylon. But this insect is now considered to be merely a local variety of *Lecanium hemisphæricum*, an insect found all over the world, and whose origin is uncertain. On the other hand, not a single undoubtedly native species has attracted any notice as an insect pest in Ceylon.

We have only to recognise these facts to appreciate the importance of a properly conducted system of quarantine for all imported plants and fruit. Our insular position in Ceylon, with but one main port of entry, gives us a peculiar advantage in carrying out such a system. A single quarantine station, with a single fumigatorium, will be sufficient in our case to deal with the whole importations of the island. It is true that, in spite of quarantine regulations, particular pests have found their way into protected countries. In such cases failure must be attributed to incompleteness of execution. And, though some few pests may have evaded all precautions, how many others must have been refused entry? The records of existing quarantine establishments give long lists of dangerous insects detected on arrival, and destroyed before they have had the chance of obtaining a footing in the new country. I believe it is the custom at most quarantine stations to examine imported plants and fruit, and if they *appear* to be free from blights, to pass them without treatment. But I maintain that not even the most experienced entomologist could guarantee a plant as absolutely free from insect life. Minute larvæ and eggs may lurk beneath bud-scales, in the axils of leaves, or in unnoticed crevices of the bark. To be really effective, quarantine must be complete. Every live plant and fresh fruit should be subjected to treatment, *whether it appear to be free from disease or not.*

The only sure way of reaching every hidden insect is by fumigation. If properly conducted, there is little danger of permanent injury to the plant. Even though some few delicate plants may be injured, or actually killed by the process, this is a very small consideration in comparison with the damage that may be effected by a single imported pest. What, for instance, must have been the pecuniary loss to the colony from the ravages of the 'green bug'—a loss that, in all probability, might have been prevented. And compare this loss with the value of all the delicate plants that have ever been imported into Ceylon! But, for such tender plants, it is possible to employ other treatment than is recommended for hardy shrubs and trees.

For wholesale fumigation of plants and fruit their is nothing to equal hydrocyanic acid gas, generated by mixing cyanide of potassium, water, and sulphuric acid in certain proportions. This treaament is cheap and effectual. The gas is of the most deadly nature, and will penetrate every crack and crevice, and do its work thoroughly. The application is quite simple. All that is required is a close-fitting chamber, provided with a flue for the escape of the gas after the operation. The more air-tight the chamber, the more complete will be the work. It should be fitted with racks to receive removable trays, upon which fruit may be spread. The objects to be fumigated are placed into position; the chemicals are mixed in leaden or earthenware pan and placed on the floor, the door shut, and the room kept closed for from half to three-quarters of an hour. The flue is then opened, and, after a sufficient time (about half an hour) has been allowed for ventilation, the door is unlocked, and the plants, &c., removed. It is not advisable to take the subjected plants directly into the open air if the sun is shining. They should be kept for a few hours under shade, which will greatly lesson any danger of damage.

Mr. C. P Lounsbury, official Entomologist at Cape Town, has kindly supplied me with full particulars of the work of the Fumigatorium at that place. From his letters and reports I have extracted the following directions and suggestions:—

For each 300 cubic feet of space enclosed (and in proportion for greater and smaller spaces) 1 ounce of 98 per cent. potassium cyanide, 1 ounce of sulphuric acid, and 2 ounces of water will be required to generate gas of sufficient strength to kill the insects. Double this strength, or the same amount of meterials to 150 cubic feet enclosed, may be used upon woody plants without danger of seriously injuring them. The greater strength should be employed whenever practicable, as it will ensure the death of the eggs as well as the active insects.

Imported plants are usually in a more or less dormant condition, which lessens danger of injury. Mr. Lounsbury writes, in his Report of June 1897. 'Injury to the tips of new growth generally results. This injury is in no wise serious, and is quickly outgrown. The operators consider it a favourable indication, as when such injury results it is quite certain that the gas has been present in sufficient strength to destroy all of the insects.'

With respect to fruit, I again quote from Mr. Lounsbury's letter: 'I had lemons and oranges analysed after treatment, and found that after a few hours not more than a trace of the gas remained in the rind. There is much more natural cyanogen in a single seed (so the analyst told me) than what remains in the fruit from fumigation. We have no complaints of any effect on the keeping qualities of the fruit.'

To generate the gas 'the required quantities cyanide and water are first placed in the generating vessel, the cyanide being broken into small pieces about the size of lump sugar. The operator then adds the acid, pouring it slowly into the vessel to avoid splashing, and immediately withdraws.'

The above treatment is suitable for fruit and hardy plants. Tender garden plants are usually imported in Wardian cases, and may be treated separately. We have—in the 'Wardian case'—an air-tight chamber ready to hand, in which the plants can be fumigated before their removal. After a large series of experiments with various fumigating media, I find that hydrocyanic acid gas remains by far the most efficient insecticide and the least injurious to the plants. But with delicate succulent plants I find it has to be applied rather differently. A more concentrated dose of the gas applied for a shorter period is most satisfactory in its results. In a Wardian case, containing about sixteen cubic feet, I find a dose of ½ ounce cyanide, ½ ounce acid, and 1 ounce water, with an exposure of half an hour, will kill every individual of a colony of Orthezia (the most resistent of all Coccids) without in the least affecting the plants. The treatment should be carried out only after sunset. According to Mr. Lounsbury's tables, these proportions of chemicals should be sufficient for a space of 140 cubic feet with a longer exposure.

The other materials tested were (1) a preparation of concentrated nicotine, sold by the XL-all Company; (2) McDougall's fumigation paper; (3) Jeyes' fluid; (4) naphthaline; and (5) common tobacco leaves. Nos. 1, 3, and 4 were evaporated by means of a small spirit lamp inside the case; Nos. 2 and were lighted and allowed to smoulder. All these materials, applied in different lengths of time, resulted similarly in more or less complete injury to the plants, and very incomplete destruction of the insects.

If there be no Government quarantine establishment in the general planting interests, importers should safeguard themselves individually by properly disinfecting all foreign plants before distributing them or putting them out in their gardens.

Further directions or the application of the 'gas treatment' will be found in the sections treating of Curative Measures. (*See* pp. xxvii—xxxi.)

Perhaps of equal importance as a preventive measure is the maintenance of plants in a vigorous free-growing condition. This is a fact that has been recognised by gardeners for many generations. Anything that interferes with the free flow of sap immediately lays a plant open to attack from its insect enemies. A weakly, hide-bound plant falls an easy prey to every pest. Scale insects in particular, with a few exceptions (and such exceptions chiefly imported series), seem to avoid a free-growing plant, possibly finding the healthy rush of sap too strong for them. Unremitting attention to cultivation will go far towards the prevention of insect pests. Amongst causes predisposing to disease may be mentioned: (1) Careless selection of plants and the retention of weakly seedlings; (2) Insufficient or injudicious drainage; (3) Unsuitable condition of soil, want of tillage, and—perhaps—of fertilisers.

Under the category of remedial measures may be mentioned the use of resistant stock. In the history of nearly every extentsive plant disease it has been observed that individual plants—or established varieties of the plant—may show a marked freedom from the disease prevalent upon the less favoured type. By breeding from such individuals, or accidental varieties, a more or less completely resistant stock may be established. This fortunate fact has been frequently used with great success in dealing with fungal diseases. Thus a special variety of the potato plant—proof against the well-known potato disease—has been extensively cultivated. Some varieties of wheat are found to suffer but little from 'wheat rust' (*Puccinia*). We have also examples of certain established strains of cultivated plants that repel particular insect pests. In Europe the vine growers have found an American stock that to a large extent resists the attack of the dreaded *Phylloxera*; and by grafting on to this hardy stock they have been able to immunise their more delicate and valuable varieties. In Ceylon we have the strongest evidence that certain varieties of the tea plant (especially the Assam indigenous stock) are most markedly free from injury by the so-called 'mosquito blight' (*Helopeltis*). In any serious epidemic that may threaten the profitable cultivation of an economic plant, we should at once be on the look-out for any accidental varieties or strains that may prove resistant to that particular disease. In cases where the hardier stock is not otherwise so profitable as the more delicate variety, by grafting upon it a more valuable scion the latter may sometimes be rendered equally immune.

Curative Measures.

Where preventive measures have failed, as—even with the greatest care—must often happen, recourse must be had to curative measures.

In no single connection can the old proverb, 'A stitch in time saves nine,' be more aptly applied than in dealing with insect pests. In this case the 'stitch in time' is more likely to save ninety, or nine hundred, or nine thousand!

If a pest is to be eradicated, *immediate* treatment is the most important part of the process.

And the first step towards treatment should, when possible, be the isolation of the infected area. All ordinary work amongst the affected trees should be deferred until after treatment. The young larvæ of scale-insects are very minute and active, and one of the most fertile sources of their distribution is by means of clothing. The rough 'cumblies' used by the estate coolies are particularly well adapted for their transport.

Another important point is that the treatment should be applied *on the spot*. If the infected branches are cut down and carried off to some other part to be burned, they may be shedding the germs of the disease all along the way.

It is difficult to lay down hard-and-fast rules for action, so much depends upon circumstances, *e.g.* the nature of the particular pest, its extent, the nature and value of the plant attacked, &c., &c. But for the sake of example, we will suppose a case in which three or four tea bushes are found to be infested by some scale-insect that is considered to be a dangerous pest. First dig a fair-sized hole in the midst of the affected clump, and place in it some dry grass and sticks as foundations for a fire. Fill two or three buckets with one of the insecticide washes described below. Prune back the branches one by one; immerse each branch completely in the insecticide and throw it into the hole, until nothing but the bare framework of the tree is left. Sweep all fallen leaves and rubbish from beneath the trees into the hole. Next, paint over the bare stems with the same insecticide, using a large paint brush and taking great care to saturate the entire surface down to the ground. Then set fire to the heap of prunings, and cover up the remains with earth. To kill off possible stragglers, the unpruned trees immediately surrounding the affected patch should be thoroughly sprayed with the mixture. If carried out in time, these measures will probably stamp out the pest; but a careful watch should be kept for any fresh outbreak.

The above treatment is suitable only for such plants as may be cut down without permanent injury. We may now consider the case of some larger tree to which this method would be inapplicable—say an orange or cacao tree. In this case the gas treatment is the most suitable. The application should be repeated after an interval of about a fortnight, to ensure the death of larvæ subsequently hatched from eggs that may have survived the first operation. Full directions for gas treatment are given below. (*See* pp. xxvii—xxxi.)

In other cases a combination of these two method might be adopted. If two or three coffee tree should require treatment, all superfluous branches

might be pruned, dipped, and burned, and the standing trees fumigated with gas. Modifications of the treatment will be required to suit particular cases.

When a serious pest has once firmly and widely established itself, little hope can be entertained of exterminating it, though much may still be done to keep it in check.

Where trees are large and more or less detached, as in orange groves, and the crop a valuable one, the gas treatment is again the most satisfactory one. But where the cultivation is denser, and the crop not so concentrated, spraying is found to be more practicable.

The choice of the insecticide must be regulated by the nature of the crop. Arsenious compounds cannot be safely applied to food crops—such as fruit and vegetables—during the cropping season. And they can on no account be recommended for such a product as tea, unless employed exclusively after pruning. For, however minute may be the actual amount of active poison deposited on a single leaf, when we consider that it takes some 400 lb. of leaf to make sufficient tea to fill a chest, and that about 3,000 of the green leaves go to the pound, or 12,000 leaves to a pound of the finished product, it is evident that the amount of poison in a single chest of tea might be considerable. And further, during the processes of packing and transport, it is by no means improbable that this mineral poison—which would dry off in fine powder—might gravitate and become condensed towards the bottom of the chest, with dangerous results to the consumer. The danger may be considered far-fetched; but I think it should be recognised.

For the above reasons no patent preparations should be employed to any large extent, unless the ingredients are well known. Such mixtures, being designed for general use, may contain several different poisons acting in different ways, either externally by contract, or internally through the alimentary system. The proprietors of patent intsecticides not unnaturally object to disclose their formulæ, and put off any questions by asserting that the amount of active poison in the mixture is so very small as to be practically harmless. This may very well be true in most circumstances; but, as shown above, in other cases the poison might become concentrated into a small portion of the product.

For other reason compounds that depend upon arsenic or other mineral poisons for their killing properties are of little use against *Coccidæ*. Insects that subsist upon the sap of the plants should be treated with insecticides that kill by contact, such as soap, petroleum, pyrethrum, &c. Arsenic, which adheres to the surface of the plants, is useful only against pests such as caterpillars, grubs, and slugs, that take in solid food. Mr. Maskell puts the matter concisely. He says: 'Whatever damage is done (by scale insects) is effected by the sucking of the juices of the plant through the rostrum (beak) of the insect. It follows from this that applications of any fluid to the tree externally, with the object of poisoning the insects *in their feeding*, would be useless, as their food is drawn from beneath the surface.'*

There are many substances fatal to insect life, but perfectly harmless to the higher animals, that may be safely used. A list of the principal insecticides, with directions for their preparation and application, is appended. (*See* pp. xxxi *et seq.*)

The most suitable season for spraying is when the young larvæ are hatching. They are then in the most unprotected condition. In temperate climates this season varies with different species, and should be made the subject of careful observation. In tropical countries many species, and those naturally the most pernicious, appear to produce a constant succession of broods throughout the year.

To produce any permanent result, spraying must be very thorough. The success of the treatment depends upon the actual contract of the liquid with individual insects. Even when the work is done by a trained man, it is practically impossible to secure the destruction of every individual. The difficulty is greatly increased when the work has to be inrusted to natives. In conducting the operation, the position of the insects upon the branches and foliage must be carefully noted, and the nozzle of the machine manipulated accordingly, so as to throw the spray upwarts against the backs of the leaves, or downwards on to the upper surface, or horizontally against the stems and branches.

A few words may be said as to the apparatus for spraying. This is not the place to advertise any particular make of machine; but some general principles may be given to help the would-be purchaser in his choice.

Points to be considered in the selection of a machine should be;—

I. *Adaptability to Transport.*—For ordinary use, where small trees only have to be treated, there is no form so convenient as the knapsack pump. This consists of a metal vessel that rests upon the back, and is supported by straps passing over the shoulders of the operator. The handle of the pump (in the best patterns) comes forward under the left arm, and is worked by the left hand, leaving the right hand free to direct the nozzle which is attached by flexible rubber tube. The vessel usually contains the pump cylinder, and space for about four gallons of liquid. Where a larger apparatus is required, a barrel pump may be used. In this form the pumping apparatus is fixed in a barrel to which handles are attached, so that the whole apparatus can be carried from place to place by two men. Where the land is flat the barrel, or a metal tank, may be mounted on wheels for transport; but it should be designed to that the vessel may be dismounted and carried by hand to such places as are inaccessible to the wheeled vehicle. Where the lay of land is suitable, and large trees have to be treated, a more powerful apparatus may be mounted on a cart, and drawn by horse or bullock power. In such cases two or more lines of hose and nozzles can be worked from the same tank.

II. *Strength.*—The materials employed in the construction of the machine should be such as are not readily corroded by the mixtures used. Mr. Lounsbury, in his report for the year 1896,* gives the following very practical hints on this subject:—

'Iron is so quickly corroded by many of the common insecticides and fungicides that pumps in which the working parts are of this metal are not desirable. These parts of the pumps should always be made of hard brass. For the sake of economy, the bodies of most pumps are made of iron, but even here the use of brass lends greater durability, and is an advantage which in the end will probably pay for the additional initial cost. Rod-like parts and thin handles of cast iron are objectionable because so easily fractured. Any parts of rubber are damaged by contact with paraffin. Ignorance of this fact has led to the ruin of a large number of Vermorel knapsack pumps, in which a circular rubber disc is used for the propulsion of the liquid. The paraffin causes the rubber to swell, and thus becomes useless for its purpose.

'Copper is the best metal for tanks in knapsack pumps, and attention should be paid to the thickness of this metal. Thin copper will rapidly ear through. Tanks of sheet iron or tin are soon ruined by contract with liquids containing copper compounds, such as Bordeaux mixture and Paris green, and these preparations are also injuriously affected. But even copper tanks are not suitable for use with all spraying mixtures, since this metal is acted upon by the sulphur in such compounds as "eau grison" and lime-sulphur-salt mixture. In these cases, the sulphur leaves the lime, with which it had united during the process of cooking, and unites with the copper to form copper sulphide. This compound forms in a thick black layer over the copper, which, if it would remain intact, would preserve the metal

* *New Zealand Scale Insects*, p. 26.

* *Report of the Government Entomologist for the Year 1896.* Cape of Good Hope, pp. 139-140.

from further action; but, unfortunately, some of it usually breaks away, exposing fresh surface to the injurious action, and also proving an annoyance by passing through the hose and clogging the nozzle. For these reasons it is best not to use these sulphur mixtures in knapsack pumps.'

III. *Simplicity.*—All the parts of the pump should be readily accessible and removeable, so that, should anything go wrong, they may be taken to pieces and cleaned, or damaged parts renewed. The want of these facilities is a serious falt in many machines, the slightest injury necessitating the sending of the whole apparatus to the repairers.

IV. *The Production of a Uniform and Effective Spray.*—The continuity and force of the flow is dependent upon an air chamber in the pump, this feature constituting a 'force-pump.' On this account all hand syringes are almost useless. The nature of the spray is regulated by the form of nozzle employed. The chief object is to break up the liquid into such a fine spray that it will penetrate the thickest foliage in the form of a dense mist and come in contract with every part. For this purpose one of the 'cyclone nozzles' is most admirably adapted, but where it is necessary to throw the liquid to a considerable distance, as, in spraying large trees, a nozzle throwing a coarser spray must be used. It is advisable to have several interchangeable nozzles to suit the different kinds of work. There should always be a detachable cap to the nozzle, so that any obstruction may be quickly and easily removed. Many nozzles are provided with a fine point, held back by a spring, but which, when pushed forward, clears the aperture.

A few further remarks may be quoted from Mr. Lounsbury's report, in which he gives some recommendations for the care of spray pumps. 'Before a spray pump of any kind is put away after use, it should be throughly washed and clear water pumped through it; hot water answers much better than cold if stickly or soapy washes have been used. The working parts should be occasionally oiled, and if the paint on the iron parts becomes worn away it should be renewed. Attention to these details will preserve the pump for a long period, while, if they are neglected, the pump may never save its initial cost.'

(*To be continued.*)

CACAO POD DISEASE.

In December, 1898, my attention was specially called to the fact of the presence of a disease of Cacao pods on several large estates. Examination proved them to be attacked by a prasitic fungus, the full characters of which have not yet been worked out. From literature recently received from professor Harrison, it is seen that he reported the existence of a disease in Grenada in April, 1895, and also described the conditions in such a way as to leave little doubt that it was idential with that now recognised as affecting the Trinidad trees. Professor Harrison also alludes to the presence of the same disease in Surinam, and refers to my report on specimens sent by him, in the following words:—

"*J. Hinchley Hart, Esq., F. L. S., the Government Botanist of Trinidad, to whom I submitted some of the diseased pods from Surinam has informed me that a similar disease occasionally occurs on cacoa in Trinidad, but is not there looked upon as being in any way serious, and is generally ascribed to an excess of moisture.*"

Professor Harrison's conclusions have been recently confirmed by the receipt of infected pods from Grenda, which show identical characters with the infected pods from Trinidad estates. From these pods I was able to reproduce the disease in healthy pods, as in the first instance, and also to make pure culture for the study of the various forms of the fungus, and it has now been grown through its entire cycle of existence in several separate experiments.

Remarks upon the forms assumed during the growth of the fungus are however withheld, until they have been confirmed by the expert to whom they have been submitted, and it will be sufficient to note that the life history of the fungus promises to be of an interesting character. This, disease, therefore, has long been recognised in Trinidad in Surinam and in Grenada, but its infectious character was first proved by reproducing the disease by inoculation again and again at the Royal Botanic Gardens by the writer, in December, 1898. Professor Harrison observed in 1895, that where an affected pod touched a healthy one the disease was communicated, but it does not appear that special inoculations were made. Mr. Whitfield Smith, now of the imperial Department of Agriculture for the West Indies also noted the disease in Grenada while travelling with Professor Harrison. Mr. Massee of Kew makes the following *interim* Report, pending the receipt of full material for further investigation:—

Interim Report on Cacao Pod Disease.

1. The fungus appears to belong to the Peronosporeæ, but cannot as yet be determined with certainty, as the spores in sprit will not of course germinate.

2. The pods sent are completely covered with a dense felt of variously coloured hyphæ and have comletely lost all trace of the fungus causing the disease which can only be seen in the spirit material sent.

3. If the Superintendent could send a couple of Hensen's flasks with germinating spores, perhaps something might be done to determine the nature of the fungus.

4. Preventive Measures.—Spring with potassium sulphide solution (½ ounce to one gallon of water) would destroy zoospores and germinating conidia; Bordeaux mixture might answer, but a very dilute mixture should be used at first, as it appears to frequently injure foliage in a worm olimate.

5. All infected pods should be removed and burned. The disease can hardly exist on the pods only and search should be made to find its source. The conidia are frequently distributed by insects and if the trees are infested with winged insects an insecticide should be used.

On receipt of this Report I immediately applied to several planters for further material, and was met by the statements that on account of the dry weather, no diseased pods were to be found.

As, however, pods were obtainable in Grenada, there is evidence that the disease is not restricted to any certain time of the year, but is more prevalent under conditions which prevail during the wet season.

The work of investigation is being continued, and when complete a Report will be published giving full details. The remedial measures to be adopted are those laid down in my Report to the Government, viz.:—

1st. To gather and destroy all diseased pods.

2nd. The early removal and destruction of the empty pods, after the beans are removed for curing.

3rd. The dressing of all badly infected trees with sulphate of copper solution.

A strict attention to these primary recommendations will probably result in confinding the disease to small areas, but more summary measures must be taken if it is seen to make way. As however, it is fairly evident from the Reports of experienced planters, from the Report of Professor Harrison, and from my own observation, that the disease is no new thing; there is every reason to think that with due care on the part of planters, the disease will not increase. On the contrary, there is every reason to hope that when the full-life history of the organism is known, it may be possible practically to eradicate it. This hope is further justified by a Report from one of the most careful of our planters, who has adapted the tentative course laid down for treatment, as he states that the number of pods affected is rapidly diminishing on the estate he manages.—*Trinidad Bulletin.*

TEA AND COFFEE DISEASES.

(With Plate.)

Brown Blight of Tea.

The "blights" which affect tea in Assam were investigated and described in the *Kew Bulletin* for last year (pp. 105-112). Another and different one has made its appearance in Ceylon, and has been transmitted to Kew for investigation by Mr. J. C. Willis, M.A., F.L.S., Director of the Royal Botanic Gardens.

Director, Royal Botanic Gardens, Peradeniya, Ceylon, to Royal Gardens, Kew.

Royal Botanic Gardens,
Peradeniya, Ceylon,
April 10, 1899.

Sir, By parcel post this week I send you a tin containing some specimens of a fungus blight which is causing considerable injury to tea in many of the planting districts of Ceylon. It resembles the "grey blight" of Assam (which is also common here) in its action on the leaf, and I have recommended similar measures for its eradication to those used for that pest. The specimens enclosed show the conidial fructification of the fungus, and I am sending them in the hope that you may be able to give me the name of the fungus to enable me to round off my investigations into its ravages and life history. In the event of your publishing any account of this disease, I have to request that the name of the estate mentioned on the specimens be withheld from publication.

Notes upon the disease are given below.

I am &c.,
(Signed) John C. Willis.

The Director, Royal Gardens, Kew.

Specimens from Maskeliya district, 4,000 feet above the sea level, sent to Kew. Fructifying specimens pinned. Collected 7th April, 1899.

Disease like grey blight in appearance and effect, but characterised, by chocolate-brown colour of fully diseased spots on the leaves attacked. Common in the Central Province.

Shows first on upper side of leaf, and soon afterwards on lower also. Appears as yellowish-brown patches, which rapidly spread and to a chocolate or almost black colour, and as they extent their central parts dry up, die, and often fall out if the leaf is roughly shaken. When the leaf is held up to the light, a yellowish band, 1·3 mm. wide, is seen round the infected area, due to the spreading of the mycelium into the still unattacked area of the leaf, which losess its green colour.

Fructifications not often seen; on the accompanying specimens they show in typical form, as pinkish spots, more or less concentrically grouped. The spores are oval-oblong, unicellular, hyaline. The blight spreads very rapidly, and does much damage. Measures of treatment recommended are the same as for grey blight.

J. C. W.

10th April, 1899.

The specimens were examined by Mr. Massee, the Principal Assistant for Cryptogams in the Herbarium of the Royal Gardens. He furnished the following report:—

The fungus proves to be undescribed, and may be known as *Colletotrichum Camelliæ*.

All the many known species of *Colletotrichum* are parasites, and many are destructive to important economic plants.

Spraying with Bordeaux mixture, or with ammoniacal solution of carbonate of copper has proved effective in checking the spread of other species of *Colletotrichum*, and would probably prove beneficial in the present instance. In spraying plants like the tea, having glabrous leaves, success mainly depends on the fineness of the spray, which should hang like a fog. A coarse spray causes the solution to form drops which roll off the polished surface of the leaves.

In addition to spraying, all diseased leaves should be collected and burned, as *Colletotrichum* is a form-genus (=the conidial condition of an ascigerous), and if the leaves are allowed to fall and remain on the ground under the trees, the higher form of fruit would form on the decaying leaves and inoculate the new leaves the following season.

G. M.

3rd May, 1899.

The following description has now been prepared by Mr. Massee:—

The fungus present on the leaves proves to be a species of *Colletotrichum*, a genus perhaps too closely allied to *Glœosporium*, differing only in the presence of a variable number of coloured spines being intermixed with the conidiophores. Numerous species belonging to these genera are known as destructive parasites, attacking more especially leaves and fruit.

The leaves of the tea plant are probably infected in the first instance by floating spores settling on their upper surface when damp. The discoloured portion of the leaf corresponds to the range of mycelium in the tissues. Eventually the central portion of the blotch changes to a dull grey colour, and becomes studded with numerous very minute black spots, which are often arranged in irregular circles. These points correspond to the clusters of spores which rupture the epidermis of the leaf and become free on the surface, whence they are washed by rain or carried by wind to other leaves. After the spores are mature, those portions of the leaf on which they are produced become dry and brittle, and are blown about by wind, and as many spores still adhere to such floating fragments, it is not difficult to understand why the disease spreads so quickly when once established in a plantation.

As the species proves to be undescribed, the following diagnosis is given:—

Colletotrichum Camelliæ, *Massee* (sp. nov.) *Maculæ* amphigenæ effuso-indeterminatæ, primo flavo-brunneæ, dein nigrescentes, denique griseo-arescentes, postremo frustulatim deciduæ ac folium perforatum relinquentes. *Acervuli* centro maculæ laxe insidentes, epiphylli. *Conidia* cylindraceo-elongata, continua, utrinque obtusata, hyalina, episporio levi donata, 15-17 × 4-5 *u*. *Cystidia* lineari-cuspidata, septata, olivacea, 100-135 × 7-8 *u*.

Ceylon. Central Province. On living leaves of *Camellia Thea.*

Preventive Measures.—Bordeaux mixture has been proved to arrest the spread of disease caused by other species of *Colletotrichum*, as *C. lindemuthianum* on scarlet-runners and French beans, *C. Altheæ*, on hollyhocks, &c., and would probably prove effective in the present instance. Care should be taken to experiment at first with a very dilute solution until its action on the leaves is ascertained.

Diseased leaves should be picked before the spores are mature; that is, as soon as the first indications of the presence of the fungus are observed. If this practice was universally followed through the infected area, the disease could be readily exterminated.

Central American Coffee-Disease.

This disease has attracted attention for rather more than the last twenty years. But it is, perhaps, only of late that it has attained serious dimensions. Apparently, the first notice is contained in the *Kew Report* for 1876 (p. 21), where it is noticed as "Mancha de hierro" or "Iron stain." Berkeley attributed it to a minute fungus, *Depazea maculosa*, which was the only organism he could find on the diseased leaves. Dr. Ernst, however, in his *Estudios sobre las deformaciones, Enfermededas y enemigos del arbol de Cafe en Venezuela*, Caracas, 1878, was unable to accept this as the cause of the malady:—

"Berkeley opina que la *Depazea* es causa de la 'Mancha de hierro,' sin duda porque las hojas que le fueron remitidas, vinieron con esta denominacion. No queremos contradecir el aserto de tan respetable autoridad, pero tendremos más adelante ocasion de comprobar que la enfermedad llamada así es generalmente de otro orígin" (p. 17).

He further expressed the opinion that "iron stain" was to be attributed to more than one cause, and that

while in some cases it might be due to a fungus, it was generally the work of the "Coffee-leaf Miuer," *Cemiostoma coffeellum*. An account of this will be found in the *Kew Bulletin* for 1894 (pp. 130-133).

"Comprendense acaso bajo este nombre tambien otras manchas de aspecto semejante, pero dehidas á la vegetacion de un hongo, como se ha dicho más arriba; pero generalmente es la 'Mancha de hierro' el resultado dc la presencia de la larva de una pequena mariposa nocturna, que eu la zoologia lleva el nombre de *Cemiostoma coffeellum*, Stainton" (p. 17).

This opinion is important as showing that at the date (1878) when it was written the injury done by the fungus was inconsiderable.

What appears to be the same disease was the subject of a note in *Nature* by Dr. Ernst (July 29, 1880, p. 292). He says:—"There appear on the leaves small spots of a lightish green colour, which in two or three days turn hrownish." Hence the name of "Iron stain."

Dr. Cooke detected upon these patches a fungus of an entirely different kind. which he described iu *Grevillea* [vol. xi., p. 11] as *Stilbum flavidum*. He further discnssed the whole subject in the *Journal of the Linnean Society* (*Botany*, vol. xviii., pp. 461-467).

Spegazzini has recently suggested the name of *Pistillaria flavida* for the fungus on the assumption that it belongs to the Basidiomycetes. This view is not, however, supported by a microscopic examination of authentic specimens.

Of late years the ravages of the fungus have assnmed more serious dimensions. It has proved very destructive in coffee plantations in Costa Rica, Venezuela, New Greuada, and Guatemala; it is also said to have occnrred in some of the West Indian Islands.

The Government of British Cen'ral Africa, apparently under the impression that it is the leaf disease of Ceylon (*Hemileia vastatrix*), which it is not, has "temporarily proclaimed" Guatemala and the Central American States generally "to he prohibited conntries" for the importation of seeds and plants.

A lengthy correspondence has taken place with the Foreign Office on the subjeot, of which the following is the most material portion:—

Mr. Consul-General Jenner to Foreign Office.

My Lord, Guatemala, Febrnary 7, 1899.

With reference to your Lordship's despatch, No. 14, commercial, of the 4th of November, I have the honour to enclose herewith copy of a despatch from Mr. Consul Harrison, enclosing a short report by Mr. H. Pittier on the diseases which have at different times appeared in the coffee plantations in Costa Rica.

The samples of the dried leaves are being sent to your Lordship by parcels post.

I have, &c.,

(Signed) G. Jenner.

The Marquess of Salisbury, K.G.

[Enclosnre.]

Report of Mr. Henri Pittier on the diseases which have at different times appeared in the coffee plantations of Costa Rica,

Dnring the existence of the Institnto Fisico Geografico several coffee diseases were submitted for study to tbe botanical department.

Firstly, the so-called "Maya," characterised by circular zones of dead tissues on the leaves, black rotten spots on the fruit, and by the subsequent falling off of both. The fungus which causes the destruction of the tissues has been identified independently by two specialists: Messrs. Rolfs, of the Florida State Agricultural College, and Spegazzini, of the "Facultad de Agronomia" of La Plata, with the *Stilbum flavidum*, Cooke (Pistillaria flavida *Spegazz.*).

Secondly, the "Hollin" or "Fumagina," which appears as a kind of a soot covering the leaves of the coffee tree, and which is also a fungns (*Capnodium trichostomum* Spegazz).; but in this case the fungus is only a secondary symptom, as it grows on a honey-like exudation of an insect (*Coccus*, scale insect, mealy bug) which settles on the tree.

Thirdly, several cases of distinct appearance, one due to the invasion of legions of caterpillars of a moth, the name of which I do not now remember, and others which were ascrihed to overcroppiug, to rot caused by imperfect drainage, or to the presence of foul wood in the soil.

These last were all more or less localised and disappeared after a time, hut the two first are rather common in the neighbourhood of San Jose, where they reappear every year with a gradually more epidemic tendency,

However, so far they cannot be said to have assnmed a very alarming character, and tbe majority of the planters have not paid attention to them.

Owing to the excessive dranght I have not been able to fiud any trace of the fuugus on the diseased leaves; but these are snre to appear with the first rains in April and May, and if not too late for yon, I shall gladly endeavour to obtain some good samples for you.

(Signed) H. Pittier.

Mr. Consul Harrison to Royal Gardens, Kew.

British Consulate,
San Jose, Costa Rica,
February 28, 1899.

Sir,

In accordance with a circular I received from Her Majesty's Minister in Central America, I sent His Excellency for despatch to the Royal Botanic Gardens, Kew, some pamphlets and notes on the diseases which have appeared iu the coffee trees in this Republic.

I also forwarded soms samples of leaves affected by the disease which the Government obtained for me,

I now under separate cover forward you direct some samples of diseased leaves, collected for me by Mousienr Pittier, and two photographs of trees effected. These trees have recovered, but in some instances look sickly.

I send these direct as Monsieur Pittier tells me the less they travel the better, as the fungns is liable to be rubbed off.

I have, &c.,

(Signed) Percy C. Harrison.

W. T. Thiselton-Dyer, C.M.G., F.R.S.,

Director, Royal Gardens, Kew.

The leaves are most frequently attacked, and within a short time become dry and fall to the ground, so that the tree is soon completely dennded of foliage. The growing berries also dry up and fall before matnrity. New leaves are formed after some months of rest, usnally to be again attacked in a similar manner, and after the consecntive loss of foliage for two or three years, the tree dies.

Diseased leaves are at once known by the presence of one—or nsually several—more or less circnlar pale green, then hrown, and finally whitish patches, which extend quite through the substance, appeariug equally marked on both sides of the leaf. Gronped on these bleached spots, on the upper surface of the leaf, are several clear yellow drnm-stick-like bodies standing erect. Each of these bodies, which are only about one-twelfth of an inch high, is a perfect fnugus, bearing myriads of reproductive bodies or conidia on its globose head. One or more similar circnlar hleached spots bearing fungi also often occur on the berries.

On young twigs the bleached spots are elongated, varying from half to one inch in length. If the diseased patch completely girdles the twig, the portion above the wonnd dies.

Preventive measures.—Those recommended for the arrest of hrown tea blight would probably be effective iu the present instance also. Cleanliness is of primary importance. It is impossible for the disease to appear nnless spores of the fungns are present in the neighbourhood, and the most effective means for reducing this possibility to a minimum is to collect and hurn all diseased leaves and frnit that have fallen to the ground. Photographs received from Costa Rica showing coffee trees completely defoliated by the disease also show the fallen leaves lying in heaps uuder the trees.

Diseased twigs should be removed, otherwise, shonld solerotia be formed, and the mycelium become perennial in the tissues, a yearly crop of conidia would be produced.—*Kew Bulletin.*

RUBBER IN THE BASIN OF THE AMAZON.

CRUISE OF THE U.S. GUNBOAT "WILMINGTON."

The United States gunboat "Wilmington" has arrived at Manaos, a thousand miles up the mighty Amazon, says the *N.Y. Tribune*. Here the wide, deep Rio Negro mingles its placid black water with the swift yellow current of the sealike Amazon thus joining the Amazon with the Orinoco.

The credit is given to Captain A. S. Crowninshiel, of Washington, for the present extensive cruise of the "Wilmington" in South American waters, a crusie which was interrupted by the Spanish war. Her primary object is to show the American flag in ports where it is seldom, if ever, seen; cultivate friendly relations with the officials and encourage American merchants and commerce wherever possible. So far the "Wilmington" has visited over twenty ports, among them being such important commercial and political centres as Trinidad, Barcelona, Carupano and La Guayra (the seaport of Caracas), on the Spanish Main; Las Tablas, Barranca and Cludad Bolivar, on the Orinoco: Georgetown and Paramaribo, in British and Dutch Guiana, and Para and Manaos, Brazil.

The "Wilmington" will ascend the Madeira River for six hundred miles to the first cataract, near the Bolivian boundary. Thus her voyage will open up to the knowledge of the world the great Amazon basin, the extent of which is enormous and the resources of which are unlimited. But the high price of rubber to-day ($1 a pound for the crude article, in the United States and Europe has stopped for the present, and undoubtedly for many years to come, any other form of industry. The Indians and halfbreed Portuguse demand and get their own price for working in the rubber forests, and only they seem able to stand the deadly fevers and miasma. To-day the rubber industry is both the blessing and the curse of Brazil, though for the moment it appears to be the former, as every one seems to be making money. This can be easily understood when it is known that the Amazon basin, with its sparse population, exports nearly $50,000,000 worth of rubber annually. The key to this rich product and regino is Para, a thriving, rich city of about 10,000 inhabitants, seventy miles above the mouth of the Amazon. As is well known, the delta of the Amazou for serveral hundred miles is composed of large low islands, covered with water at "big river," (July and August), and abounding with rubber trees, the product of which is known commercially as "islands rubber," and it extends three hundred miles up the Amazon to Gurupa. Thence for several hundred miles the forest, though densely tropical, is sparse in rubber trees. They become thick again, however about Abidos, three hundred miles further up, and around and above Manaos is the fine Upper Amazon rubber, coming from the Rivers Tuara and Tavary, Rio Negro, Rio Branca, Solimoens, Puras, Madeira and hundreds of other streams tributary to Manaos.

While Para, by its wealth and situation is the key to the rich Amazon country, entirely controlling the valuable delta district output and largely that of the up-country, it has a new rival for the Peruvian, Bolivian and Upper Amazon rubber output in Manaos, a young giant of about thirty thousand inhabitants of recent and mush-room growth but having a beautiful opera house, palace of justice, electric railroads, electric lights, modern waterworks, sewers and asphalte streets, and is altogether such a remarkable city of great commercial future as to deserve a special letter.

Exact knowledge of the rubber districts, the gathering of the crop and the curing and transporting of the same is confined at present to three classes. The first are the "aviadores," or buyers, merchants who advance large stocks of goods, gewgaws and rum to headmen in the forest. The aviadores are mostly Portuguese, and having a "good thing," will not tell much. The second are the men or branch storekeepers in the jungle, usually half Portuguse, half-Indian, who are suspicious and secretive and great liars. They absolutely control the third class, the Indians, who work in the dense tropical forest, and gather and cure (smoke) the rubber. Left to themselves, the Indians are generally hospitable and communicative; but their dialects are little understood and their knowledge is local.

Recently a ship of only 2,500 tons left Para for New York, with a cargo of rubber, which was insured for $3,000,000. Nowadays only a bullion ship or one loaded with fur seal skins from the Pribylov Islands would carry such a valuable cargo. Naturally this valuable and constant output demands many large cargoes in return payment. Heavily loaded steamers leave New York and Europe for the Amazon three times a month, and this number may soon be increased. The United States is getting a large part of this rich trade and can increase it by judicious efforts.—*The American.*

A TEXT-BOOK OF PLANT DISEASES.

Whilst much may be effected to prevent the occurrence of disease in plants, and to put a stop to its diffusion, and whilst something may be done to mitigate its consequences, little or nothing can be done in the way of cure. Day after day we receive samples of diseased plants with an enquiry as to the nature of the disease, and almost invariably an enquiry as to a remedy. Sometimes no information is vouchsafed as to local conditions, and as to the method of cultivation adopted, and often, indeed, nothing but continued inspection during growth would enable us to arrive at a satisfactory diagnosis. In most cases absolute cleanliness and free ventilation, together with the methods of cultivation appropriate to each plant, will suffice to keep plants in health. Indeed, in very many instances it is obvious from the specimens sent to us, that slovenly or careless cultivation has been practised, perhaps unavoidably, from adverse circumstances not known to us. However this may be, disease and parasites, whether vegetable or animal, often find the condition suitable for their growth and propagation in plants whose cultivation is neglected. This is, however, by no means invariable. Many of the samples sent us come from establishments where rigid care is exercised, as in market establishments where superb cultivation is the rule. Nevertheless, a fungus may make its appearance, and quickly destroy the hopes of the cultivator. Over-crowding, and the growth of the same crop in the same houses year after year necessarily favour the spread of the disease when it does break out. How often do we find the Tomato crop spoiled from this cause?

We see the same carelessness in woods; the unfortunate trees get injured in a variety of different ways, but all resulting in an open wound. Nothing is done to cover this over, and so the wound, it may be a mere crack, offers a resting place for the spores of the fungi, which, as in the case of canker of the Apple, eventually compass the destruction of the tree. Now the main reason for this loss—much of it avoidable—the main reason, is sheer ignorance—indifference and apathy do the rest.

It cannot be expected that the cultivator who has his business to attend to can attain that knowledge of detail that it is the duty of the expert to accumulate, but he should get a sufficient grasp of general principles, and sufficient information as to the manners and customs of fungi and insects, to be able to avail himself of the teachings of the expert, and turn them to practical account. It is with this object in view that we desire now to call attention to Mr. Massee's recently published *Text-book of Plant-diseases caused by Cryptogamic Parasites* (Duckworth & Co.) After some generalities, the author proceeds to describe seriatim the chief parasites which affect our cultivated plants. The order followed is that of the botanist, the author going from order to order in systematic series.

We have waited long indeed for anything like a complete handbook of this kind. We have had special books like those of Marshall Ward and Worthinton Smith, excellent in their way, but strictly limited; we

have had various translations from the German, and we have had endless articles in our own columns and those of our comtemporaries, but Mr. Massee is the first to give us in anything like a complete form, a combination of these scattered records into a systematic whole. This will be invaluable as a book of reference. Our gratitude to the author is proportionate. —*Gardeners' Chronicle*.

THE OIL TRADE OF SOUTHERN INDIA.

The Oil Trade of Southern India, which in 1897-98 was represented by an export of 46,804,81 gallous, valued at 58,699,30 rupees, and accounted for an area of 1,646,628 acres of cultivation, is one of those branches of industry which possesses the remarkable characteristic of never, under any circumstances, suffering from under-production. The supply at all times is equal to the demand. Domestic consumption is largely in excess of export, but can never be exactly ascertained, as much of the oil used is obtained from trees and shrubs growing in a wild state, and manufactured by the poorer classes. Among plants regularly cultivated for oil are the coconut, the gingely, two species of the racinus from which lamp and castor oil are made, and linseed-coconut oil is exported from the Western Coast and from Ganjam, Rajamundry and Tanjore on the Eastern Coast. It is extracted from the *dry* kernels of the nut by expression in the ordinary native oil mills. When made with care, the oil is colourless and solid at a low temperature, but very liable to become rancid by keeping. For edible purposes it is made from the *fresh* kernels, which are rasped, and the milk, being squeezed out, is boiled with a little water. The Cochin coconut oil is reputed the best, and is exported in large quantities to the United Kingdom and to France, where it commands good prices, and is used for the manufacture of candles and soap. Coconut oil soap is lighter than water and is the basis of the floating soaps of the perfumers. Inferior soaps made from coconut oil are liable to melt away if exposed to damp, and if allowed to dry will shrink. For these reasons, and to prevent loss, only small quantities of the article are made at a time. The method of manufacture in the coast is exceedingly simple. Two cisterns are built one above another; the upper filled two-thirds full with the compounds above specified and tightly pressed down; water being poured on the lye filters through and is received in the lower reservoir. About two-thirds or so of this lye is stirred with oil and allowed to stand for three days with occasional subsequent stirrings. The solution is then removed and boiled in a copper cauldron until the soap separates. Pure water is poured on the mass and stirred to clarify it, and the soap is then moulded and cut into bars, when it is ready for sale. Coconut oil is to the inhabitants of the Western Coast what *ghi* is to the Hindu elsewhere. Property in the coconut tree is considered a sound and profitable investment, as each tree is calculated to yield 2½ gallons oil per annum, and the refuse after the oil is extracted finds a ready sale as cattle-food or as manure—to say nothing of the coir and thatching that form bye products of the palm. Before the introduction of kerosine oil, coconut oil was a very popular illuminant. It still enjoys a great deal of favour in this respect, as it gives a bright light, and there is no risk whatever in its use.

Among the poorer classes Gingely Oil is much used for domestic cookery, sometimes by itself, but more frequently as an adulterant of *ghi*. Care is necessary in the preparation of the oil, which becomes discoloured by the matter from the epidermis of the seed, which should first be repeatedly washed in cold water or partially boiled in water to remove the reddish-brown colour before passing it through the mill. In the northern districts of the Presidency, the babool gum is added to the seed before expression, but it is doubtful whether this is done exclusively to improve the oil, for it also confers an increased value on the oil cake as a cattle-food. The manufacture of the oil is primitive, and the mills used in the present day are the same as were employed for the purpose thousands of years ago. By throwing in the seed without any preliminary cleaning the oil becomes discoloured and depreciated, but it can be make very clear, when high prices are obtained. This clear oil is the yield of a white seed, which however is not so profitable as the black seed or *Sesamum orientale* of commerce. The price of the oil varies according to the district, but a uniform rate is obtained in Europe, where it is imported for the manufacture of soap.

Two oils are extracted from the *Racinus communis*: one known as castor oil, and the other the real lamp oil of the country. *Racinus communis minoribus* is a small-seeded variety, that after being sifted and cleaned is slightly crushed between two rollers; then freed from husks and coloured grains and enclosed in squares of clean gunny or canvas. These squares are put into a mould to give them uniformity, when they are known as bricks. The bricks are then arranged alternately in a screw or hydraulic press with sheets of iron, and pressed till the oil exudes through the pores of the gunny, and is received into clean tins. After boiling the oil is filtered through blankets, and forms the castor oil of commerce. Much less care is exercised in pressing the larger-seeded variety of the Racinus and the seed is partially roasted before passing through the mill—both imparting the dark and even dirty red colour which this oil has when sold in the bazaars. As much as 50 per cent in weight of oil can be obtained from the seeds, and the price of the oil is always maintained. The ground or Manila nut is largely grown in Madras more particularly in North and South Arcot and in Nellore and Tanjore. The cleaned seeds yield by cold pressure 43 per cent by weight of a clear, straw-coloured, edible oil possessing all the qualities and characteristics looked for in imported salad oil—which often is nothing more than Indian ground nut oil clarified and reimported from Europe. This oil is seldom used by the natives, but they eat the nut after being slightly roasted over a charcoal fire. From the trade statistics it appears that 19,631 acres of ground in Madras grows linseed, and that the crop is raised principally in the northern districts. It is not, however, easy to arrive at the actual acreage of linseed because it is sown in furrows on the borders of fields, and so escapes calculation. The introduction of linseed into the Punjab, and especially into Sind, is credited to a military settler on the Nilgiris, General Wormald, before his retirement. He appears to have tried it at Jamadar-ka-Sandee, and the experiment is said to have been thoroughly satisfactory from the commencement, the yield being tenfold. The above are the staple oils of the Presidency, but the list might be easily multiplied by local products of which no account is taken, such as poppy oil, the oil of the *neem* tree, cotton seed oil, the oils of various woods, and fish oils. Few of us in fact remember what a great part oil plays in the economy of the country.—*Pioneer*.

New Source of Gutta-percha.—M. Jouffroy d'Albans, the French Consul at Singapore, writes to the *Courrier de Saigon*, regarding an invention made by a Frenchman in the Straits to extract guttapercha, principally from the leaves of *Isonandra Hookeria*. The leaves, dried, are sent to Belgium and France for the extraction of the gutta. This trade in dry guttapercha leaves has considerably increased at Singapore and Penang. The gutta thus produced is said to be of such high quality that the Eastern Extension Cable Company has contracted with the inventor for a supply of it.

COCONUT CULTIVATION.

MANURING.

I had the privilege lately of discussing the above subject with a veteran, and as his opinions are entitled to much weight as being those of one of the foremost coconut planters, I trust he will pardon me for making them public and for discussing them. Apart from the fact that his long experience, his well-known intelligence and his close observation entitle his views to respectful consideration, his having been a pupil of the late Mr. Davidson of Jaffna in early youth and imbibed the wealth of scientific wisdom which places that gentleman far above his fellows then or since, is an additional recommendation in his favour.

My friend holds very decided views that coconut rees should be manured every alternate year. That if manured at longer intervals, it represents to a large extent money thrown away, as a large proportion of the manure goes towards helping the trees to regain lost ground and a small proportion to putting on crop. In his experience he has found ashes a valuable, nay indispensable, fertiliser for coconuts, and trees which responded in a sort of way to the application of castor cake and bones, showed wonderful results as soon as ashes were added to the mixture. By a systematic and intelligent system of manuring he has known an estate increase its yields, not in one leap of course, but gradually to three times its old average yield. The system was for half the trees to be manured one year and half the next. The manure used was castor-cake, bones and ashes. In addition to that, the husks were carted to the fields and the husks of about 50 coconuts were dropped between every four trees and together with all the branches, were burnt and the ashes spread over the ground. This was done from end to end of the estate with the results indicated above.

I may be pardoned the tenacity and the presumption of discussing the views of so high an authority. But no one more than he will appreciate the good resulting from such discussion, and the unwisdom of blindly following a system simply because it is practised by an acknowledged authority. Circumstances alter the experience of different persons and the observation of one man may not be in accord with another.

I am at one with my friend that it is desirable and more than desirable, necessary, that half an estate should be manured one year and half the next. But I would say as a general and not invariable rule. Experience and observation show that a sandy and therefore hungry soil takes up manure very much faster than a heavy soil with body, or to be more precise, coconut trees growing on a sandy soil derive benefit from an application of manure very much quicker than trees growing on a heavy soil and in proportion to the quickness of the benefit is the quickness with which the results disappear. I therefore think that the rule of my friend is a necessity on a light, sandy soil, and is not so much of a necessity as a desirability on a heavy soil. On such a soil, digging it up and mixing it can be resorted to in the interval between two manurings.

However desirable or even necessary frequent manurings are, it is not everyone that can manage to manure half of his estate annually. Many circumstances, not necessary to be detailed, will stand in his way. Under such circumstances the object of the Planter should be to try to minimize the acknowledged running down of the trees. I think this could best be done by the use of such fertilizers as yield comparatively slow results. In my opinion, bone meal is one such. Bone in its raw state is insoluble or not readily soluble. In contact with the soil and the moisture in it, it decomposes slowly, the length of time depending on the minuteness of the particle and the composition and quality of the soil, among other causes. It is generally believed that bones are of value chiefly, if not entirely, according to the phosphates in their composition. This is to a certain extent true, but bones in their decay yield ammonia which assists the action of the phosphate of lime. I have always held consistently to the opinion that quick-acting manures are of value chiefly in the cultivation of annuals, where the result are required in a given time. For the cultivation of perennials, and especially of coconuts, slow-acting manuress are the most desirable. The trees are not stimulated to heavy-bearing and then quickly fall off, the bearing is steady, even and continuous. It is for this reason, I do not favour the use of steamed bones or of super-phosphate for coconuts. When raw bones are used, the effect is spread over a number of years and after a few applications, the quantity of available phosphates and ammonia in the soil will, if necessity become large, and the benefit to the trees will be in proportion.

Now as to the value of ashes as a manure, there are now two opinions. Their composition is dependent on the substance of which they are the result. Mr. Cochran has made known the great value of the ashes of husks, and people can easily realise by the light of his analysis, to what extent their soils are being impoverished by the removal of husks or their non-return to the soil in the way practised by my friend. Would not economy be attained by carting to the field the ashes of husks instead of husks in bulk? I am not of those who believe in the fertilising properties of manure; but I believe in the value of fires at nights in coconut fields. They help to attract and destroy injurious insects, such as red-beetles and the moths of caterpillars.

I have heard

THE PRAISES OF ASHES

sung very loudly but unfortunately my experience with them hardly accords with that of others. I know an estate where the branches had been burnt between the trees for a number of years. The ground was black with ashes. Anxious to see the extent to which the roots of the coconut tree availed themselves of this rich store of manure, I had the ground dug. My disappointment was great when I came across a few straggling rootlets and not the mass of rootlets within the experience of others. I have had ashes lying in heaps between coconut trees and yet they were not attacked by the rootlets in anything like the way in which a heap of cattle manure or any other heap of decaying vegetable matter with a lot of moisture in it is attacked. I have often wondered how roots take up the fertilising matter in ashes when so few are seen to attack them. Again I have applied wood ashes and the ashes of coconut branches in large quantities of from two to three basketfuls to coconut trees both by themselves and in conjunction with castor-cake and bones with no striking results.

My experience has been that there is no application for coconut trees to equal

THE DROPPINGS OF CATTLE

under the trees. I have tied one animal for ten days to trees that had been neglected and not manured for a number of years and growing on poor white sand and the results were such as to make me most enthusiastic on the benefit of droppings. The branches of these trees were of a yellow, sickly hue and the bearing was being reduced to zero. Within six months the trees were carrying dark, green heads and commenced to throw out large blossoms. The effect, as regards crop, lasted for two years, as the trees were weakly, but the colour of the foliage did not relapse to its original colour. My method was to tie the cattle to the trees without removing any soil and then to dig in the droppings after rain had washed in the ammonia. I think digging in before rain has washed in the ammonia, will help to dissipate it. I am inclined to think that this most encouraging result is due almost entirely to the urine. The solid excrements of ten nights from ordinary village cattle that are grazed on poor pasturage, hardly equals two basketfuls. It will be useful to find out what the composition of the urine of cattle is to enable us to make up a mixture to resemble

it as closely as possible. In the stall-fed cow leaving out of consideration the water which is nine-tenths in weight, we have Organic matter .. 60

Containing nitrogen equal to ammonia ..	9
Inorganic matter	20
Containing phosphoric acid . ..	7

That does not look formidable. Perhaps, Mr. Baur, with that enterprise which is his characteristic, may find out what the total solid and liquid excrements of one animal is for one night, analyse that and multiply it by ten and give us a mixture representing the application per tree. It is impossible to entirely manure an estate, or even a large part of it, by tethering cattle to the trees, so the next best thing to be done is to secure a mixture resembling it as closely as possible, for the efficacy of the droppings of cattle in the immediate neighbourhood of trees is assured.

I have had the opportunity of watching the difference in effect between the droppings of cattle and an application of cattle manure, castor cake, bones and ashes. The former was to a field that had been neglected and unmanured for a number of years. The latter to a field that was in cultivation and had been manured a couple of years before. Both fields were composed of poor, white sand. The former field responded at once with beautiful dark green heads and a brave show of blossom and very good yields for two years. Though the crop fell off after that, the appearance of the trees did not. The better part of the application to the latter field was appropriated to bring up the condition of the trees and but a little went towards the putting on of crop. We read a great deal last year about "denitrification." That may be responsible for the disappointing results, which, however, are not general.—*Cor.*

PRODUCE AND PLANTING.

Bacteria and Tea.—Mr Allen Cooper, of Southampton, quoting the article in the "Contemporary Review," in which it was asserted that the particular flavour of different growths of tobacco is "attributable to the agency of microbes alone," these microbes being generated during the process of fermentation, thinks that an interesting question for tea planters arises in connection with it. Not only is poor tobacco transformed, but it has also lately been discovered that it is possible to have living cultures of Bacteria which can give a delicious flavour to butter and a fine taste to cheese. "It occurred to me," says Mr. Cooper, "that the distinguishing flavour of teas from different countries might be attributable to a similar cause. It may not be the plant so much as the Bacteria generated during fermentation that gives each district its distinctive character. All tea planters are agreed on the importance of the fermenting process for the proper development of flavour, and the necessity of arresting this fermentation, or 'fixing' it (as it is called) at the critical moment, over-fermenting producing a peculiar rancid odour and flavour. Mr. David Crole, in his lecture on the Chemistry of Tea (given on February 10th, 1897, at a meeting of the Society of Arts), was very emphatic on this point; and some tea planters I was fortunate enough to meet on the s.s. "Nubia," four years ago also emphasised the importance of this part of tea manufacture. They all agreed that the fermentation period was the critical one for the proper development of flavour. This raises an interesting question. Is it possible to alter the flavour of teas from poor districts by the introduction of living cultures of Bacteria developed from micro-organisms taken from fermenting tea in the more favoured districts?" Perhaps Mr. Watt or Mr. Bamber may have something to say on the subject.

A Declining Market for Tea.—Under the above heading "The Grocer" discusses the tea market as follows: "It is now three months since the market for tea was in a buoyant condition, with prices of the common descriptions astonishingly high for these modern days of cheapness, and when, moreover, the position of the distributing trade in April last was exceedingly strained and awkward. The subsequent trend of the market has proved that at the period referred to quotations had touched their highest points, when at public auction the Indian growth fetched the following rates: Common to good leafy Pekoe at 8d to 1s 3d; Broken Pekoe at 8d to 1s 4½d; Orange Pekoe at 8½d to 1s 5½d, with finer grades up to 1s 10d and 2s 3½d; also Broken O.P. from 10d to 1s 6¾d; Pekoe Souchong and Souchong both at 7¾d to 11d; fannings at 6d to 1s 4½d; Broken tea at 7d to 11½d; and dust at 6d to 8½d per lb. Also at the same time Ceylon tea was readily taken off as under: Common Pekoe Souchongs at 7¾d to 8½d; Pekoes at 8d to 8¾d; ordinary broken teas at 6d to 8½d; with fine broken and Orange Pekoes at from 1s to 1s 4d. From these extreme rates there has latterly been a gradual, though uninterrupted, decline of 1½d to 2d per lb., so that common grades of Indian Pekoe and Souchong now are not worth more than 6½d to 7d, and those of Ceylon realise only 6d to 7d, with the medium sorts in proportion."

A Return to Lower Rates.—"This reduction in the value of both Indian and Ceylon tea marks a great step towards a return to lower rates, such as will enable the dealers and retailers once more to push the sale of the article with their accustomed vigour and success; and, provided that the rupture between importers and the wholesale dealers is soon healed up, there is a prospect of business being renewed with increased activity during the remainder of the year. At first, when 'top' prices were the rule, operations were more or less cramped, partly by the manipulations of speculative members of the trade, and also by reason of the fix in which many blenders found themselves in having no reserve or precautionary stocks to fall back upon at the moment they were most needed. The comparative dearness of teas that had to be pressed in to do duty for the popular 'shilling canister' likewise helped to instil a fresh spirit of cautiousness in all bona-fide purchases for home use, and for several weeks in succession considerable difficulty was experienced in satisfying all retail requirements with the same promptness and satisfaction, as when in the latter part of 1898 clean leafy teas were easily procurable at 5d to 6d per lb. Stiff prices, nevertheless, wrought good service in hastening forward the arrivals of new season's teas from India, which came to hand in larger quantities and earlier than they did last year. Besides this the merchants were willing sellers on terms which continued to show a distinct improvement on the lowest rates that were current before the extraordinary rise commenced, and enough tea was secured by the blenders and others to keep matters going on pretty smoothly at a season of the year when, as if by universal consent, the wants of consumers generally are neither so large nor so urgent as in the cooler months, when supplies are superlatively abundant."

A Strong and Unsurpassed Demand.—Notwithstanding the fact that the clearances of tea in the United Kingdom have been somewhat inflated by the heavy duty payments made in March and April last, in anticipation of an increase in the Customs' impost, there is reason to believe that the rate of consumption is fully equal to, if not decidedly beyond, that in 1898, or indeed, in any previous year, and this may be regarded as a guarantee for the continuance of a strong and unimpaired demand on home trade account. Granted this much, it naturally follows that, with a plentiful supply of new season's teas coming on from all parts, the necessities of the market here will be well provided for, and orders to any extent will be capable of fulfilment at more reasonable prices than were demanded in the spring of this year. Other questions of vital importance have also to be considered just now, and it will be greatly to the advantage of both importers and dealers if they can succeeded in arriving at a friendly understanding where any cause for disagreement is supposed to exist, and so keep the whole machinery of the London tea in perfect working order.—*H. & C. Mail*, July 21.

TEA PESTS AND SCIENTIFIC REMEDIES.

The Kunaon correspondent of the *Planter* writes :—

I suppose all have read Dr. Watt's remarkably eandid views on this matter of a scientist for tea, and if one or two of his observations do not strike home then surely nothing will. "I know of no industry of a similar magnitude where empiricism is allowed to have such limitless sway." Such is the opinion of a dispassiouate and perhaps the highest scientific authority in Indian at the present moment. It amounts surely to the severest condemnation of current tea methods that has as yet seen the light of day, and besides which Sir Alexander Mackenzie's observations were nowhere. I note Cachar votes for an entomologist, but Dr. Watt states that Ceylon has, in addition to their chemist, appointed an entomologist of the very highest European repute, and with the incomparable advantage of himself being a planter. Why then, I would venture to ask, should India spend a lot more money on another entomologist ? Ceylon planters are surely fellow men, and nothing discovered there in the way of entomology is going to be hid under a bushel, because, as I understand, Mr. Green is Government entomologist. In my very humble opinion, entomology without direct reference to renovation, and great improvement in cultural methods will turn out to be of the least real advantage to tea. I speak in this matter as one with twenty-six and a half-year's consecutive horticultural practice in its every brauch of fruit, plant, and vegetable life. Now if there is one fact borne out by all experience aud a multitude of observers, it is this :—No sooner does any kind of plant become enfeebled, than in come the insect pests. As sure as the sun rises in the east and sets in the west do iusects show at all times a marked preference for the weak or enfeebled, no matter from what cause arising, and I am perfectly sure—setting aside the scientific aspects of the matter and looking at exactly where it affects the planter, this matter of insect pests and plants is for all practical purposes in the nature of cause and effect. There are quite a number of most effective insecticides. I do not believe for example any green fly exists that will for a moment staud against a strong decoction of quassia ; thrip also succumb to its intensely bitter qualities. Again, the Bordeaux mixture, consisting simply of sulphate of copper aud lime, is remarkably effective against a number of insect pests and I know that even water heated to 180° F. will effectively destroy green fly. Here is a remedy which in the abstract costs nothing at all, but the moment one eomes to practical details and its application to thousands of acres of tea plants growing out in the open what of the expense, and what of the expense still more in the case of remedies costing money and their application to thousands of acres of tea. It will surprise me exceedingly if the salvation of tea is found in entomology. Of course, it would be of the greatest interest and probably no small value to know the exact life-history of each pest and how best to take the pest at the greatest disadvantage. All the same we shall, of course, see what we do see, but entomology is not going to stamp out mosquito, thrip, red spider, and green fly while the inducing cause remains, or at all events, there is such a magnificent field for their existence. If I may venture an opinion, I would say tea today stands in need of two conspicuous reforms above all others first—tea manufacture reduced to a scientific basis in its every process. Secondly, absolute reform in culture, which includes pruning. If this be so, then it indicates a chemist in the factory, and what Dr. Watt terms an agriculturist in the field, but which, I think, would be much more correctly termed a horticulturist or at all events, an agri horticulturist. It is not by any means clear what an agriculturist, as such, can know about the tea plant or is likely to discover. . . . At the present moment this is how I have for a long time conceived the matter stauds :—The planter has by his methods of culture and ghastly pruning, produced a sickly bush, constitutionally. A vast acreage of tea is not what it ought to be, and might be, or rather should have been ; the food aud drink of this sickly out of sorts bush is wrong, but the planter now demands a doctor and medicine to beat off the pests that beset its enfeebled frame. Now if experience is worth anything at all, this is not the way to go to work to effect a permanent cure. There must be a radical change in the methods that make the pests so plentiful. Without this it will be a ceaseless warfare, and Assam may be filled with entomologists, and as time goes on they will get more and more to do, because, however much you may destroy on the spot, you can't at any price destroy surroundings of unlimited dimensions without reform in the plant and culture. It is my firm conviction the phrase "let 'em all come" will be a very painful reality for tea, and this will be constantly growing worse until the root of the matter is energetically dealt with.

COCOA PLANTING IN SAMOA.

A report on cocoa plantiug in Samoa has been received at the Foreign Office from H. M. Consul at Apia. In an introduction to the report, the Consul states that it would seem, assuming the price of cocoa not to fall radically and no cocoa disease to arise, both of which events seem unlikely to occur, that a potential commercial future has at length arisen for the Samoa group, after years of depression owing to the fall in the price of copra and the apparent unsuitability of the climate for other cultivations, such as rice, sugar, tea or cotton.

Small capitalists (£500 to £2,000) going to Samoa and purchasiug or leasing land for the purpose of cocoa planting, would stand a good chance of making a fair income after the first three or four years—provided that they either possess a practical knowledge of tropical planting or will take advice from those in Samoa who have experience in the matter.

Cocoa was first experimentally grown in Samoa by "Die Deutsche Handels und Plantagen Gesellschaft der Sudsee Inseln zu Hamburg" on one of their plantations near Apia. In 1892 a favorable report on the quality of the bean was received from Germany. In 1893-4 a large number of seeds were distributed among the Samoans, and a few small plantations were started by some of the more enterprising of the British and other foreign residents, which are now coming into bearing. The number of small plantations are rapidly increasing and the amount of land at present bearing cocoa trees is estimated to be 75 acres.

The most encouraging reports continue to be received from Hamburg, San Francisco and Sydney regarding the quality of the Samoan cocoa, the price varying between £60 and £80 per ton. An English planter in this island has an agreement with the German firm to cut and take all his cocoa, he paying freight to market and receiving two-thirds of proceeds, and the firm one-third, but it is stated that this arrangement has not as yet been extended to others. However, there need be no difficulty as to drying and preparing the cocoa for market, as another planter who prepared his own in a rough manner received 16 ceuts (about 8d) per lb. in San Francisco, whereas the cocoa prepared by the German firm realised 18 cents (about 9d) per lb. in Hamburg. The expense of fitting up, drying and preparing rooms would not be great if divided amongst several planters. Small plantations are

to be preferred, at all events at present, to large ones as in the former personal supervision can be given, and the initial and working expenses are of course a mere fraction of what a large plantation would entail.

A small plantation of 6 acres holds about 1,200 trees, and these in the third year produce about 140,030 pods, and it is apparent that, even with the liberal allowance of 15 pods to the pound of marketable bean, each tree would produce from 6 to 8 pounds of prepared cocoa bean per annum. The trees begin paying in the third and fourth years after planting, and are in full yield after the fifth. Apparently there is practically no age limit to the bearing of a cocoa tree. The two heaviest cuttings are in April and September, and between times there are cuttings about every three weeks. The full grown pods, the immature one, and the blossom may all be seen on the same tree.

The best and cheapest way of preparing bush land for cocoa growing is to thin out the undergrowth but to leave the trees standing so as to afford shade to the young plant. The cost of clearing and planting ought not to exceed £4 per acre. The young plants are raised in small coconut baskets filled with earth in well shaded nurseries and planted out; or the seeds are planted in holes well covered with topsoil, 15 by 15 apart, and when the cocoa trees have attained two years' growth, banana trees are planted between the rows of cocoa, the shade trees are ring-barked, and when dead are felled and allowed to rot in situ. It is surprising to see how very little damage—in fact practically none—is done to the plantation by the fall of these trees.

The cocoa tree seems to be able to bear an extraordinary amount of rough usage in Samoa. When the trees are about three years old the banana trees are cut down and rooted up. The tree with a single trunk is not considered desirable in Samoa, and by allowing two or three main stems to grow and training the laterals to branch out well a comparatively low bush is obtained, which does not attain the height to which the cocoa tree is allowed to grow elsewhere, and consequently is not so much damaged by hurricanes, and produces a larger crop of pods than the other variety.

The kinds of cocoa planted in Samoa were Caracas and Forastero, but as usually happens by hybridization, a distinct kind has been produced, partaking of the best qualities of each variety. The Samoan cocoa is prepared in the Ceylon manner and is especially well adapted for confectionery purposes.

It is advisable not to prune the trees, as this entails stunting them in Samoa. In fact the golden rule for would-be planters in Samoa is not to follow any rule blindly, however well established, but to adapt the general rules of cocoa planting to the special factors out here, and not to try and make Samoan nature follow scientific rules, but vice versa. The cost of land near Apia is about from £1 10s to £3 per acre if purchased from whites, and about 4s to 8s per acre if leased from the natives on a 20 or 40 years' lease. The soil is rocky and volcanic, and well adapted for cocoa.

Although labor in large masses is practically unobtainable in these islands and the native Samoan is by no means an energetic and hard-working laborer, yet sufficient floating labor for small plantations is to be had. The price is about 24s to 35s a month per laborer, his food costing about 16s per head a month. One man ought to be able to look after six acres of well grown cocoa in the dry season, but two are required during the wet season from December to May.

In Samoa the cocoa is a robust, hardy tree, growing luxuriantly, and yielding abundant crops with but trifling cultivation.—*Cultivator.*

HYBRIDISATION.

In connection with an International Conference of Hybridisation held under the auspices of the Royal Horticultural Society during the past two days a dinner was held last evening in the Whitehall Rooms, Hotel Metropole. Sir T. Lawrence, President of the Society, was in the chair, and the company included the Netherlands Minister, the Belgian Minister, Earl Annesley, the Master of the Rolls, Sir E. Fry, Mr. Herbert J. Webber, and the Rev. W. Wilkes (the Secretary). The tables were beautifully decorated with roses, carnations, orchids, and other flowers, the gifts of members of the Society, who also presented the fruit for dessert. The toast of "Horticulture" was proposed by the Rev. Professor Henslow, and acknowledged by Mr. H. J. Webber (United States), Professor H. de Vries (Holland), and M. H. de Vilmorin (France). Mr. Webber remarked that the possibilities of hybridisation had hitherto been little realised, and the few examples which had been brought to notice were simply heralds of the advances that were likely to be made in the future. He thought it a matter for regret that there was no way in which the originator of a new fruit or a new flower might derive due benefit from his labours. Every endeavour ought to be made to popularise horticulture, so that any discoveries that were made by hybridists might meet with their just recompense. Mr. W. Bateson, in giving the toast of "Hybridists," insisted on the importance of bringing about a permanent investigation in this country of the problems of hybridisation, such as was now being conducted in the United States. (Applause.) Mr. W. T. Swingler (Washington) replied. The Master of the Rolls proposed "The Royal Horticultural Society," and Sir Trevor Lawrence, in responding, observed that it was owing to the fact that Robert Fortune was sent out by the Royal Horticultural Society to China that the cultivation of tea was undertaken in India, and ultimately spread to Ceylon, and that now the bulk of the tea consumed in Western countries come not from China, but from the country into which Fortune introduced it. The Society now numbered nearly five thousand Fellows, and, though not wealthy, was in fair water. It needed, however, two things, which he hoped would soon be forthcoming, namely, a hall in London and a new garden larger than that at Chiswick, and not so near London. (Applause.) Other toasts followed.—*Morning Post*, July 13.

MR. JACKSON'S NEW TEA MACHINERY.

Hitherto it has been impossible, even under most careful factory management, to prevent dust, powder and foreign matter, such as hair-like splints of bamboo and fibre from green leaf jute hessian withering tats, being mixed with the tea in packing. From careful experiments, made with various grades of tea of their appearance, the amount of foreign matter contained in them varied from ½ per cent to 2½ per cent. To obviate this a new

PATENT TEA DUST EXTRACTOR,

for use in tea factories, warehouses, and packing rooms has been designed by Mr. Jackson.

By a series of simple adjustments, the machine can be made to remove only powder, or light fibrous matter; or all the dust may be removed, and the residue thoroughly mixed; or the dust may be extracted, and the residue divided into two grades, medium and large. The design of the machine is such that a fluted feeding roller in hopper regulates the supply of tea, so as to spread it into a thin stream, four feet wide. It passes down a series of steps, arranged in a

zig-zag form, all the while being subjected to a current of air, which may be regulated to any necessary pressure, by means of shutters, to suit the material to be operated upon. The capacity of the machine is from 500 lb to 1,000 lb per hour, according to the thickness of feed, and the quality of tea to be dealt with. The materials used in the construction of the machine are of the best possible description, the framing being of the best selected pitch pine, lined with sheet steel, and the machine body is mounted on four strong cast-iron standards. The fan is powerful, and accurately balanced, and the bearings are fitted with special oil-catching devices. The discharge doors are both moved by one bar and handle, and arranged so that they may be shut, or kept partially open, while the machine is at work.

Mr. Jackson has also constructed a new balanced

SELF-CLEANING TEA SIFTING MACHINE

with a view of giving every facility to the factory manager to produce the best grades of tea required by the market. Its advantages may be summed up as follows: First. Balanced Action. There are two superposed carriages containing the sieves, supported, and held in their track by wooden springs, securely bound to angle foundation plates at their lower end, and pivoted at the top. Motion is imparted to the sieve carriages by a crank shaft with double throws, the crank pins being arranged opposite each other, thus producing a perfect balanced action, reducing the action of wearing parts to a minimum, and making heavy and costly foundations unnecessary. Second. Adjustable Incline of Sieves.—The two carriages are hinged at the end next the driving shaft, and the other end can be set level, or at any necessary incline, to suit the nature of the tea to be operated upon. Ready means for attaining this object are provided by a clamp-device, which is free to revolve and accommodate itself to any angle at which it may be desired to set the sieve carriage. Third. Self-Cleaning.—It is generally known that to keep the wire meshes of sifting machines free from entangled leaves has been one of the most difficult problems for any designer of this class of machinery to solve, and we believe that Mr. Jackson has overcome this by introducing a cleaning device underneath the sieves. The self-cleaner consists of numerous wooden splints attached to sliding rods, and pitched to suit the exact travel necessary to thoroughly free the wire meshes from curly tea leaf. The sliding rods are secured by clips, which can be instantly released by the attendant, and all that is necessary to clean the sieves is to set them at liberty, and hold them by hand for a few seconds, and the movement of the machine will do the rest. When the cleaning arrangement is not in use, its splints act as bearers to support the wire mesh without in any way reducing the efficiency of the sieves. Fourth. Interchangeable Sieves.—Two wire mesh frames and sieves are supplied with each machine, the numbers of mesh to suit option of purchasers, these are interchangeable, and can be instantly taken out to give place to frames with different sized meshes to suit various classes or methods of sifting. The crank shaft is bent from the bar, and mounted in a massive pedestal, with oil catching devices arranged in bearings, the shaft runs a hollow casting which is practically dustproof; but immediate access can be had to shaft for the purpose of lubrication or clearning when necessary, by simply lifting a lid. Being accurately balanced the power required is nominal. The driving pulley is ten inches diameter, by three inches wide, and the speed is 265 revolutions per minute.

The following report on the working of Jackson's Patent Tea Packing Machine, by a planter of long experience, has recently been received from Ceylon: "I am much pleased with Jackson's No. I Packer. It is an excellent machine, works noiselessly, speedily and packs well. I should not like to revert to the coolie trading system of packing again, after using Jackson's Packer."

The following is a copy of a letter received from one of the proprietors of the above estate: "I am very glad to inform you that our first invoice packed with your machine had not to be rebulked in London; formerly most of our grades in an invoice had to be re-bulked. This of itself represents a good saving in the twelve months."—*H. and C. Mail*, July 21.

CEYLON CHAMBER OF MINES.

The meeting which was held on Aug. 8 afternoon was very largely attended and the proceedings lasted about an hour and a half. Mr. F. M. Mackwood, Chairman of the Chamber of Commerce, occupied the chair.

The following are the official minutes of the resolutions passed:—

1. To form a Chamber of Mines.

2. That all gentlemen interested in mining be eligible as members.

3. That membership be divided into two classes, viz., full members and associated members.

4. That entrance fees and subscription be as follows: full members - entrance R50, and annual subscription R50; associates—entrance R10, and annual subscription R10. Associates to enjoy all the privileges of full members, except that of voting on any resolutions brought before the Chamber.

5. That all the members registering their names (*i e.*, sending them to the Secretary *pro tem*) by 31st August shall be original members, after which date all candidates for membership to be ballotted for by Committee.

6. That a Provisional Committee to hold office for six months be appointed consisting of the following gentlemen: Capt. Tregay, Messrs. Jacob De Mel, E C Skrine, Rajapaksa Mudaliyar, A S Berwick, J W C De Soysa, S P Jeffery, R Fielding, J Clovis de Silva and N D P Silva. Four to form a quorum, and that Mr. Geo. Armitage be appointed Secretary *pro tem* and a member *ex-officio*.

7. That the Committee shall draw up rules and regulations for the working of the Chamber of Mines and report progress to a general meeting of members to be convened about the end of September.

8. That minutes of the proceedings be sent to the Hon'ble the Colonial Secretary, Colombo, and through him to the Secretary of State for the Colonies, the Crown Agents for Ceylon, and to H.E. Sir West Ridgeway.

Rubber from Peru.—Much indiarubber is brought from Peru to Para, in Brazil, for exportation. It is traced by M Hubert of the Para Museum, to a species of Castilloa, possibly identical with the Castilloa of Central America.—*Globe*, August 4.

CEYLON FOREST DEPARTMENT.

THE CONSERVATOR'S REPORT FOR 1898.

After a careful reading of Mr. Broun's report for the past year we are struck with the moderate tone of his really telling criticisms upon the Government interference with the Department that took place during his absence from the Island last year. Opportunity was then taken to obtain a report upon the state of the Department, Mr. F. C. Fisher, C.C.S., Acting Conservator, being chosen to draw it up. The conclusions of this report were, it will be remembered, at variance with the Conservator's opinions, and Mr. Broun found it necessary to reply. As a consequence of his report—the necessity of which has not been proved —Mr. Fisher was requested to submit proposals for the re-organisation of the Department. And what was the substance of these proposals? It was very much that of similar proposals made in the opening chapter of Mr. Broun's report for 1896. On the latter's return to the Colony, he was graciously included by Government in the Committee appointed to report on Mr. Fisher's proposals. But—and here must have lain a source of the utmost annoyance to the Conservator who has been so continuously badgered—partial effect had already been given to these proposals before Mr. Broun returned. Yet we find the mere fact alone chronicled—nothing more. Perhaps silence is stronger than words, and the Government will be warned in time not to try the patience of their trained officers beyond the limits of natural endurance.

The following changes, which were described less specifically in the Commissioner's report (extracts from which appeared in our issue of February 23rd), are those that have come into effect with the present year—changes which Mr. Broun has accepted and therefore, no doubt, intends to make the best of :—

(i.) Separation of the *General* from the *Provincial* Forest Administration, the former including the management of areas to be reserved as permanent forest estates under the direct control of the Conservator, while the latter dealt with forests and waste lands available for the extension of cultivation. In the Western and Sabaragamuwa Provinces and in the Galle and Matara Districts of the Southern Province, however, this separation was not recommended for the present for any forests whether reserved or not, but it may take place when the rights of the Crown in and over waste lands have been determined after survey. The inclusion of eertain valuable forest blocks which have for the present been left under the charge of Government Agents has been left for discussion later.

(ii.) Division of the forests under General Administration into the following six charges or "circles" each under an Assistant Conservator, viz :—

(*a*) *Northern Circle*, including the valuable forests in the Northern Province and serving the export centres of Jaffna, Mannar, and Mullaittivu.

(*b*) *North-Eastern Circle*, comprising the forests of the Trincomalee District, West Tamankaduwa, and the eastern portion of the North-Central Province, and serving the export centre of Trincomalee.

(*c*) *Eastern Circle*, consisting of the valuable forests of the Batticaloa District (excluding the Panawa pattu), Tamankaduwa east, and the Nilgalla pattu, Province of Uva, and serving the export centres of Kalkuda bay, Batticaloa, and Arugam bay.

(*d*) *South-Eastern Circle*, composed of forests of the Panawa pattu, Eastern Province, the Hambantota District, and the southern portion of Uva, and serving the ports of Okanda and Hambantota.

(*e*) *North-Western Circle*: valuable forests of the North-Western Province and a few in the western portion of the North-Central Province, serving the port of Puttalam and the market centres of Kurunegala and Chilaw.

(*f*) *Hill Reserves*: hill forests of the Nuwara Eliya District and Haputale and in Matale north, Central Province, serving the planting districts and the town of Kandy.

(iii.) Working of the forests under the Conservator of Forests on a more systematic and concentrated plan, and of those not required for reservation by a system of licenses.

(iv.) Reduction of the number of officers and of expenditure on staff, while providing an improvement of the prospects of the superior and clerical staffs.

The effect of these changes will be, in Mr. Broun's opinion, to injure the finances of the Department for a while, because of the large area now made available for obtaining timber for sale, and the low rates at which this timber will now be sold. On the other hand, the Department will benefit by the P.W.D. being henceforth allowed to supply itself in the open market, the Forest Conservancy being thus enabled to relinquish the practice of keeping deteriorating stock on hand to wait the good pleasure of the P.W.D. With regard to the area of the circles above specified, these are the figures supplied, with the Conservator's comments thereon :—

	Square Miles.
Northern Circle	1,587·50
North-Eastern Circle	1,858·00
Eastern Circle	2,200·00
South-Eastern Circle	2,297·00
North-Western Circle	1,556·75
Hill Reserves	513·00
Total ...	10,012·25

It is however not to be understood that all this area is forest, much less *good* forest. Considerable areas will have to be excised and placed again under the control of Government Agents, and they will possibly amount to from one-half to two-thirds of the total area. On the other hand, there are eertain valuable forests which have not been included within the circles which it will be desirable to place under the control of the Conservator.

A good deal of demarcation has gone on during the past year, the Central, Uva and Sabaragamuwa Provinces alone being untouched.

The enumeration of the bits of surveying done reads somewhat jaggedly, and after vainly endeavouring to grasp a solid estimate and a fairly lucid idea of the work accomplished, we come on the following paragraph as upon an oasis, and we most heartily re-echo the cry for method, *method*, METHOD, which is there very soberly expressed :—

It is necessary that all the areas placed under the Conservator be now worked on a systematic plan. The enumeration surveys and measurements of sample plots which have been hitherto made are unfortunately not sufficient for fixing a possibility, either by volume or by area, for our principal species. It is however imperative that the past disconnected way of carrying on operations here, there, and everywhere, should be changed, and I have assumed for the present that most of our important species take about forty years to grow from the second girth class (4 ft. 6

in. girth) to first class (6 ft. girth). For the present therefore, and until we can get more reliable data from sample plots, about one-fortieth of the area will be worked each year, taking only such first class trees as can be spared for exploitation. Before long I hope that a reconsideration of this system can be made. It is intended that cleanings and seed fellings should precede the principal fellings by a few years. The fuel reserves will be worked on a rotation of twenty years.

On the subject of sample plots further interesting information is supplied. The measurement of these is, we are glad to learn, becoming more universal in the different Provinces; but unfortunately several that were started have been left neglected. On them the different species of trees have not been sufficiently represented and deductions as to rate of growth have been rendered unreliable. Valuable material is expected in a few years; but, meanwhile, as Mr. Broun says, "ten years have passed during which most important data might have been got together."

The reorganisation of the superior staff has now come to pass, and effected a reduction in the number of officers—a course which is to a certain extent satisfactory to Mr. Broun, since, as he points out, it is a one which he has advocated as far back as 1891. Even with the 34 rangers, which form the executive staff—at salaries ranging from R1,500 to R360—under the new scheme, the staff, including 17 rangers, under the Conservator, it is shown, is still somewhat small, considering that some 10,000 square miles have to be administered; and this fact will scarcely be affected if more than half the total area is given back to the Provincial Administration. The Conservator very wisely remarks, however, that it is better at the outset not to overman the Department, but to add to it as fresh requirements are proved.

The review of the plantations for Artificial Reproduction shows every promise and a rebuke is duly administered for the previous disparaging remarks on them, made by Mr. Fisher, apparently without personal inspection of the plantations. This portion of the Conservator's report we shall reproduce in full. The indiscriminate issue of free grants in the little populated districts of the North-Central Province and Trincomalee is also deservedly condemned as tending to foster unthrift and a want of self-reliance. Nor is it, we may add, likely that the native estimation of the value of land in the neighbourhood of the Northern Railway likely to be increased by these doles from the Government landlord.

With regard to the financial results the surplus has fallen short of what was anticipated partly because of the value of plumbago lands leased, (the rents R20,105 not being put down as forest revenue) and partly because the value of timber on lands in the N.-W. Province (R20,000) was not credited to the Department in actual cash. The net surplus (R14,738) would, with these addditions, have attained R54,843 or more than double that of last year. In 1896 it was R9,605, but in 1897 we are at a loss for the correct figure; for in Mr. Fisher's Report for 1897, it is put down at R23,573 and in the comparative table in Mr. Broun's statement for 1897 and 1898 it is given as R27,372. This is entirely due, we notice, to the surplus for the Eastern Province being given in the former table as R15,368 and in the latter as R19,167; similarly the total Eastern Province and receipts differ in both cases. In conclusion we have the following paragraph accounting for the delay, upon which we were about to comment, in issuing the report:—

> There is again delay in the submission of this report on account of the lateness in receiving the provincial reports. This is due to the precipitate hurry with which officers were transferred to new headquarters just before my return from home, the consequence being that the record, are in one place with the Government Agents and the Assistant Conservator and his clerical staff in another. The result is delay in obtaining necessary data and in submission of reports.

In view of this we do not see how any blame can attach to the Conservator himself, and further we have to thank him for a peculiarly interesting and succinct account of the Department under his charge—one which stands in the first rank of public importance to the people and colonists of Ceylon.

SCIENCE FOR AGRICULTURE.

WE have often noted the backwardness of British Colonial Governments, in recognising the importance of providing scientific help for the furtherance of agriculture, as compared with Continental Governments. In the case of German and Dutch Colonies, a staff of scientists is always attached to public institutions, so that their services might be available to planters and others; and specially is this the case in Java. We need not go far back to recall the official refusal at first to enlist the services of Mr. E. E. Green for the benefit of the Island, and his subsequent appointment as Honorary Entomologist; and then the confession, or rather pretence of inability to find a cryptogamist to inquire into the cacao disease, which led to the engagement by private proprietors of Mr. Carruthers, whom the Government afterwards consented to subsidise. The lesson taught the nation in industrial and commercial matters, in which Great Britain is paying the penalty of a narrow conservatism which has enabled American and German goods to oust British goods even in British Colonies, ought to be laid to heart, and applied to matters agricultural, if there is to be progression, rather than stagnation and retrogression. We refer to the subject just now, in view, of the movement to secure Mr. Carruthers' return to the Island as a Government servant, and of certain correspondence which has come under our notice between the Government of Bengal and Dr. Watt, the Reporter on Economic Products with the Government of India. Dr. Watt, in a letter bearing date the 17th May, from Calcutta, in replying to inquiries in connection with grants of R5,000 a year sanctioned by the Lieut.-Governor of Bengal, and R2,500 a year for three years by the Chief Commissioner of Assam, towards the cost of employing an expert to study and report upon the cultivation and manufacture of Tea in Assam and Cachar, writes to Sir Patrick Playfair in very explicit terms which have some ap-

plication here. He draws a distinction between the cultivation and the manufacture of Tea; and while admitting that the problems on which he had been previously consulted, touching blights and pests, are connected with cultivation, he points out that it would be vain to expect the officer proposed to be employed to deal with those problems, to be able to advise as an expert on all questions relating to Teas. Even in respect of pests and fungal blights, Entomology and Mycology are two widely different studies; and it is almost impossible that a Biologist could be an expert in both branches, though he may conduct useful investigations in both. But Dr. Watt regards it as contrary to all experience that a Biologist could be an expert chemist at the same time, and he proceeds to refer to our own proceedings in the following terms:—

Some few years ago the Association brought to India a chemist (Mr. Bamber), and he furnished a report which no doubt most of the members of the Association have read. Its practical value is, therefore, a point I need not deal with. At the present moment the Ceylon planters have engaged Mr. Bamber as chemist, but they have secured also the services of Mr. E. E. Green, an entomologist of the very highest European repute. Mr. Green is himself a tea planter of many years' experience, but has consented to become Government Entomologist mainly with the view to devote his entire energies to the investigation of the pests of the tea plant. With a chemist and entomologist at work, Ceylon may reasonably hope to make some progress, but I do not look with much favour to a scheme that would secure one officer, in the hope that he would be an expert on every scientific problem of tea planting. I should, therefore, recommend the Association to carefully consider whether they want a chemist or biologist as the first and most important consideration.

The action of the Government there having been inspired by the local Association, Dr. Watt approves of its action, subject to the foregoing qualifications; and while appreciating the desire of those engaged in the Tea Industry to discover remedies for pests and blights, to cultivate the bush to the best advantage, and to perfect the methods of manufacture, he declares that he knows "no industry of a similar magnitude where empiricism is allowed to have such limitless sway." These are strong words: but do they go beyond the truth? It is easy to blame the Government here for inaction; but it was not so long ago that our "preachings," on the need of calling science to the aid of cultivation and manufacture—to decide on the choice of manures and to study the chemical changes which the leaf underwent from the plucking to packing—were regarded as mere vapouring. And Dr. Watt justifies his language by reference to a former Report, in which he gave instances of the diametrically opposite views held by "well-informed and successful planters on almost every aspect of the industry." It is only "the immense capabilities and vast powers of endurance of the plant" which have been the safeguard of planters, as their conflicting opinions might both be wide of the mark and the profits obtained be far short of what they should be. Holding, as he does, that the limit to the blindfold trusting in Providence and to the endurance of the plant, is not very remote, he declares that there is scope, "not for one scientific expert for a few years, but for half a dozen for a life time." These are words the truth of which our Government should recognise not only in connection with the immediate demands of the Planting Community, but also in connection with the project of a Department of Agriculture, or a Board, which is under inquiry by a Commission. Dr. Watt's advice is that, if funds will not permit of the whole question being dealt with, the Association should decide whether it wants (*a*) a Biologist to inquire into pests, (*b*) an Agriculturist to inquire into cultivation, or (*c*) a Chemist to suggest improvements in manufacture. These are precisely the departments in which knowledge and help are needed here: and it behoves the Government to consider the question, not merely by the light of the immediate present but as one intimately connected with the maintenance and extension of an industry on which the progress in prosperity of the Island so largely depends.

In this connection we may call attention to the very encouraging report of the Superintendent of the Agricultural School, the bulk of which we reproduce elsewhere.

China Tea not popular in Amerca.—An interesting report of Mr. Consular-General Brenan has just been published by the Foreign Office. He says that the Ping-suey teas were the purest and best that have been brought to market for thirty years, and yet they met with a poor reception in America. This is partly attributed to the absence of colouring matter, which caused the leaf to be unattractive to the eye. Seeing that the tea is only wanted for making an infusion, and not for putting on the table in the shape of leaf, it is strange that consumers do not prefer to have the pure uncoloured leaf as it is used by the Chinese themselves. Colouring enables the tea curers to hide defects which would otherwise be exposed. The crop was 80,000 half-chests against 112,000 half-chests last eason.

Tea Planting in the United States.—Here are further particulars from the *American Grocer*, regarding a subject which we treated editorially quite recently:—The Secretary of Agriculture is following in the foot-steps of former Commissioner Le Due, in furthering tea planting in the Southern States. Secretary Wilson regards a domestic tea industry as one of the hopeful problems of the day, if, indeed, it has not been demonstrated to be a success already. From the specimens sent to the Department of Agriculture, he is induced to believe that the plant can be produced at a profit in the United States, and to this end he is prepared to use his best efforts. Fourteen thousand tea plants have been secured and sent to the South in continuation of the experiments started by General Le Due several years ago, when the labour question was the difficult problem to solve. Since then machinery has come into use for the preparation of the leaf for market, but there still remains the question of labour for picking. In Ceylon and India, pickers receive a few cents per day and it is doubtful if tea planting in this country can be made a profitable industry until labour is as cheap as in China and other tea growing countries.

"ALL ABOUT RUBBER."*

A planter writes:—"I have been utilising all my spare time lately in studying the book you have just brought out under this title. The wealth of information you have gathered together on the subject is amazing. I had no idea there was so much literature and knowledge of the product, its cultivation, &c., &c., extant! As a present day experienced Ceylon planter, I have been through the usual mill, beginning in coffee while it was still our staple, then doing a full time at cinchona with half-holidays at cacao and cardamoms, and the last few years at tea; so it is quite on the cards that I rush into rubber yet. Should the fates ordain it thus, I shall enter on the job with a light heart, as with your book as a guide one should be able to steer clear of the *puthuarle* mistakes that were made when most of the other products were first undertaken on a large scale in Ceylon. The book fully merits its title and the re-printing in full of the recent circulars from Peradeniya, brings it quite up-to-date. The only thing I note with regret is that you have not been able to include the figures promised by E. S. G. (on page 18), presumably because the tappings for rubber, he mentions, are still in progress? As those figures will be most interesting and useful might I suggest, that when they are available you have them printed on slips and post one to each local purchaser of the book, so that it can be pasted in rendering the volume more complete."

Other planting friends have written as follows:—"The latest edition of this valuable compilation comes at a most opportune time, when the attention of enterprising planters is directed to new fields, and when it is so important that their efforts should be well and properly directed, and that they should not be misled into ventures of doubtful issue by reason of scanty acquaintance with the requirements of the cultivation, the markets, and the various methods of meeting the new wants of modern trade; the book is full of information and right up to date; with all the recent experiments made in preparation, &c. in Ceylon, and statistics and news relating to the industry, from all parts of the world. The scientific side is not lost sight of either, and the Botanical list of rubber-yielding plants is included. Mr. John Ferguson seems to have a special gift of compiling these works of reference, but this volume on rubber is not only about the *best manual* he has given us, but it is issued exactly at the *right time* and with the latest and best information available, and should be read by all proprietors and planters interested in the lowcountry and by men who look for additional sources of income and investment.

"The latest report and tests from the Peradeniya Gardens are fully given and there is not an item of intelligence up to the present time that is omitted in this most useful volume."

"I think the book will be most valuable in the hands of all growers of rubber, not in Ceylon only, but wherever rubber is cultivated by English readers. Hoping you will have a large and ready sale for the book as some recompense for the trouble and expense you have been to in bringing all up-to-date information together in so handy a volume."

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* All about India Rubber and Gutta Percha—Third Edition R5, cash R4, postage 20 cents.—*Observer Office*, Colombo.

INDIAN TEA ASSOCIATION (LONDON.)

The following is from the annual report to be presented at the meeting on Tuesday, July 25th;

The General Committee have the pleasure to submit to members the following statement on the conclusion of the 19th year of its operations. On the resignation of office by General Henry Hopkinson, C.S.I., at the last annual meeting—on account of advancing years and ill-health—Sir Henry Seymour King, K.C.I.E., M.P., was unanimously elected Chairman of the Association for the year under review.

FORWARD ESTIMATES OF THE INDIAN TEA CROP.

With a view to ensure greater accuracy in estimating the volume of the coming crop, it has been arranged that the Indian Tea Association, Calcutta, should procure special estimates from managers to be submitted by the end of June, and published immediately afterwards, and that no estimate be published before that time.

CROP OF 1898.

The original estimate and actual outturn of tea from the several districts in round figures (millions of lb.) were as follows:—Assam, estimated 64, actual crop 62; Cachar and Sylhet, estimated 49, actual crop 45; Darjeeling and Terai, estimated 11, actual crop 11; Dooars, estimated 26, actual crop 26; Chittagong and Chota Nagpore, Kangra, Kumaon and Dehra Dun, estimated 4, actual crop 5; Private and Native Gardens, estimated 4, actual crop 4; estimated total, 158; actual crop total, 153. Of this crop there were shipped direct from Calcutta to places outside the United Kingdom over 18 million pounds, leaving 135 for shipment to this country.

The chief places to which the direct exports from Calcutta went were as follows:—Australasia—1898: 6¼ million lb.; 1897: 7 million lb.; 1896: 5¾ million lb.; Indian Ports—1898: 4 million lb.; North America—1898: 3 million lb.; 1897: 2½ million lb.; 1896: 2½ million lb.; Turkey—1898; 2½ million lb., China—1898: 1 ,million lb.; Germany—1898: ½ million lb.; elsewhere—1898: ¾ million lb.; 1897: 6¼ million lb.; 1896: 5¾ million lb. Total—1898: 18 million lb.; 1897: 15¾ million lb.; 1896: 14 million lb.*H. and C. Mail*, July 21.

NATAL TEA.

At the Durban Agricultural Show on July 12th, prizes were offered for tea and with regard to the single exhibit the "Natal Mercury" says:—"The tea is disappointing, because only one exhibitor has come forward—Mr. J. A. McMillan, of Barnsdale, whose teas, however, are pronounced to be of first-class quality. Mr. McMillan secures two first prizes. It is said that the conditions are in some respects rather stringent, and that this accounts for the absence of competition. This rather enhances the value of the prizes won by Mr. McMillan, as he complied with the conditions, and has the satisfaction of knowing that his tea has been very favourably commented upon by those competent to judge."

ON THE PREVENTION OF TEA PESTS AND BLIGHTS.

BY OLIVER COLLETT.

(*Read before the Ambagamuwa Planters' Association, Aug. 21st, 1899.*)

The Director of the Royal Botanic Gardens in his recently issued Circular on the subject of Tea Blights says:—"The immunity from disease that tea has enjoyed in so marked a manner for many years is now disappearing; many insect and fungus enemies, some of local origin, some introduced from Assam and elsewhere, are now attacking tea in many parts of the Island, and it behoves all interested in the cultivation to be upon the watch to recognise the signs of disease as soon as possible after they appear, and to at once attack and as far as possible eradicate the disease. The diseases are here, and all experience of cultivators in all ages and lands shows that such diseases come to stay; they cannot be completely eradicated, but they can be kept in check if taken in time."

Here is good and sound advice to which we are all, I am sure, prepared to give our best attention. At the same time many of us may not be inclined to fall in with the opinion of Mr. Willis, that the health of the tea-plant in Ceylon is now for the first time being seriously threatened by the attacks of fungus and insect-pests. On the contrary, I think, it is the experience of most of us that these pests have always been with us; and when we come to consider the fact that millions of insects and of parasitic fungi are daily brought into existence, apparently for the sole purpose of feeding upon the alimentary juices of plants, the wonder rather seems to be that plants which are kept under constantly cropping conditions—as in the case of tea—should be able, season after season, to retain their natural vigour and keep their foes at bay.

The test, of course, comes when an unusually unfavourable season occurs, and the resources of the plant are naturally tried to the utmost. If it is left, as not infrequently happens, in a weakened and impoverished condition, it becomes, according to a well-known law in nature, a ready prey to the attacks of disease. Thus, insect and fungus pests find the opportunity that they have been waiting for; and they very soon make themselves known to us—both in our tea fields and in the columns of the public press.

Now, the present season (1899) has been, up-to-date, a distinctly *abnormal* one. We had a severe drought in the early part of the year, followed by an excessive rainfall in the months of May, June and July—just the sort of season in fact, which would be likely to do harm to our tea-bushes—and the consequence has been that they have been exposed to an outbreak of disease of unusual severity with a smaller chance of warding it off than has been the case in former years.

It is, therefore, our business to consider—and that very seriously—whether, in our general system of cultivation, we are doing all that is needed to help the bushes to preserve the necessary amount of strength and vigour that shall enable them, in an unfavourable season, to combat successfully with the attacks of disease.

It is, I believe, the opinion of Indian planters that we, in Ceylon, predispose our bushes to the attacks of enemies by our system of plucking from them all the year round, and of only allowing them a rest—if rest it be—during the time that they are pruned down. Now, it is possible that there may be more truth in this than we have hitherto supposed. You are aware that all plants under cultivation must have a resting season; and it is perhaps a question whether we ought not to be satisfied with a slightly diminished yield per acre, in order to allow our bushes to have a complete rest for a month or two, at the least, between each pruning. Certain it is that resting has an enormously beneficial effect upon tea under any circumstances; and I can quite conceive that the time will come when we shall find it ultimately profitable to allow a small proportion of our acreage—say one-eighth or one-tenth—to remain unplucked (but of course meanwhile weeded and cultivated) every season.

Again, there is much to be done in the way of systematically removing all lichenous growth and moss from the stems of our bushes after every pruning. I am aware that a great many planters regard this as an altogether unnecessary operation but, there can be no doubt whatever that the removal of this growth invigorates the bushes to a great extent; and that where it is left to grow upon the branches it affords a dangerous refuge and breeding place for all manner of fungus and insect pests.

There is one more point to which I should like to refer, and that is the question of the abandonment of fields of diseased and unprofitable tea in the midst of cultivated areas. A patch of tea, once abandoned, becomes a spore-nursery for every kind of disease, and a source of considerable danger to all estates in its immediate neighbourhood. It is possible that this question, which, in my opinion, involves more serious issues than any of those just discussed, may be one which the Planters' Association may not be sufficiently powerful to cope with. If so, our only resource will be to ask Government to introduce measures which shall render compulsory the destruction of all abandoned areas of tea by fire.

In these remarks, which have been hastily drawn up to be in time for this meeting, I have confined myself to a general consideration of what, in my experience, are likely to be the best methods of protecting our tea bushes against the attacks of disease. I have not attempted to discuss the nature and treatment of fungus and insect pests. The former are treated of by Mr. Willis, in the Circular already referred to; and the latter are fully described in the little work by my friend Mr. E E Green, entitled "Insect Pest of the Tea Plant," with which most planters are already familiar.

A LESSON IN TEA.

(From the *American Grocer.*)

This is not a made-up story, but a true narration of facts. Many readers may at once recognize the parties concerned—for my part I am under a promise not to mention names.

A certain firm purchased a large quantity of tea in the foreign markets two years ago. Almost immediately after the purchase the price of tea went down and the speculation turned out to be a failure. The firm was in a quandary, as it had over $100,000 expended in the purchase, which would not then realise more than three-fourths of that amount. The dilemma was explained to a wise man, and he said he would think over the matter and report next day. When he came back in the morning he asked the firm if they would turn over one-fourth of the stock to him and he would guarantee to get full price for it. They

did so, and a large quantity of tea, which was then stored, was consigned to the wise man.

About three weeks afterwards a new brand of tea was widely advertised. It was in pound and half-pound packages, and had a pretty and distinctive name. It was advertised at 50 cents a pound, and in less than two weeks the supply was exhausted. The name of the tea and its peculiar quality was widely talked about.

Another lot was put on the market and the advertising kept up, and then a third and last lot was advertised, but in the meantime the firm had "smelt a rat" and had been let into the secret. They went out into the market and bought a whole lot more of the tea they had been "stuck" on, and in another month they had duplicated the order. Their failure turned out to be howling success, and all through the machinations of the wise men, who had conveyed the idea of giving this tea—which was of the most ordinary quality and cost but 25 cents a pound in bulk—a distinctive name and putting it on the market as a package tea, well advertised to the consumer. It cost 3 cents a pound to pack it in neat shape and about 4 cents a pound to advertise it, leaving a profit of 18 cents a pound on 400,000 pounds of tea—$72,000 profit in about nine months!

The whole scheme, be it remembered, originated in a direct loss of 25 per cent. on the first purchase, and it was only the genius of the wise man who was called into council that turned the failure into a success by the simple process of giving the goods a distinctive name, putting them up in attractive form and advertising them liberally to the public. The same tea was being sold by grocers at the time for 30 cents a pound, in loose form, but the wise man rightly conjectured that in a better and more presentable shape it would sell at a better price, provided that it was properly advertised.

The same tea is being advertised and sold today, and that is why I cannot mention its name.

But there is a great advertising moral for consideration. To take any article that is a failure at its own price, make no change in the goods intrinsically, but merely in the outside appearance; advertise it judiciously and create a steady demand for it at twice the price in the short space of a few months, ought to be the best kind of an answer to the cranks who have the audacity to tell us, in these enlightened days, advertising does not pay."
—*John C. Graham in Printers' Ink.*

The above is very suggestive of the power of advertising to create demand; that a convenient package is a great factor in securing public favor; that cutting prices is not essentially a factor in winning trade; that it is easy to humbug some of the people at some time; that grocers are forced to sacrifice a liberal profit on bulk goods for small profit on proprietary brands of inferior quality.

We also note that this tea episode is denominated "a scheme" and that its author deliberately states that the tea sold at fifty cents per pound in packets, was the same tea that was sold in bulk at the same time, for thirty cents per pound.

The moral is plain that consumers are willing to pay more for goods put up in attractive shape than for the same articles in bulk at much lower price. This fact is clearly demonstrated by the preference given to crackers, put up in neat packages, over the same sort sold at less price in bulk; to the sale of cereals in packages at double the cost to the consumer that the same can be bought for in bulk. It is evident that package goods are most in favor with consumers, and that they are quick to pay an extra price for the more convenient service.

Is not the above narrative of "facts" also illustrative of how the consumer pays for advertising and makes it possible and profitable for plucky fellows to avoid a failure and make a "howling success?" There is a sermon with many valuable lessons in Mr. Graham's story which grocers should take to heart.

WANARAJAH TEA CO., LD.

Report of the Directors.

ACREAGE.

Tea in bearing acres		956	
planted in 1895		72	
	1896	12	
	1898	20	
			1,060 in Tea.
Timber Trees ..	...	...	20
Forest	..	..	27
Gross not available	...	..	27
		Total	1,134 acres.

The Directors have the pleasure of presenting to the Shareholders the Report, Balance Sheet and Profit and Loss Account for the year ending 30th June, 1899.

The crop harvested amounted to 336,692 lb., against a Revised Estimate necessitated by abnormal weather of 324,000 lb., of which quantity 228,420 lb. have been sold in London to date at an average of 54·98 cents, and it is hoped that the balance of the crop will be equally well sold, but in the present condition of affairs in London with the dispute between the dealers and importers still in an acute stage, it is difficult to speak with any degree of certainty upon this point. The high quality and excellence of manufacture of Wanarajah teas have been fully maintained during the year, notwithstanding a severe drought in February-March and an enormously heavy flush of tea in April-May, which tested the capacity of the Factory to the uttermost.

Manure.—The area completed amounts to 182 acres and the cost R5,631·01, but of this amount R2,219·32 for artificial manures for 55 acres has not been charged.

The amount at the credit of the Profit and Loss Account is R74,737·34, including a balance carried forward at the commencement of the year of R21,678·40.

After payment of the Interim Dividend at 4 per cent there remains a sum of R58,861·34 available, which the Directors recommend be applied as follows:—

To a final Dividend of 9 per cent making a total of 13 per cent per annum		R34,020·00
To be carried forward	...	R24,841·34
		R58,861·34

The estimated Crop for the season 1899-1900 is 370,000 lb. of made Tea, at an expenditure of R126,171 including expenditure on young clearings not yet in bearing.

The Visiting Agent's Reports can be seen by Shareholders at the Company's Office.

We regret to say that during the year our late Chairman, Mr. Thos. Mackie, died, and Mr. Dunbar was elected in his place. Mr. Dunbar is now in England and Mr. Wernham has been chosen to succeed him. Mr. Creasy became an additional Director during the year.

Messrs. Cantlay and Wernham retire from the Board by rotation, but are eligible for re-election.

The Shareholders are invited to elect an Auditor for the ensuing year, and Mr. Guthrie again offers his services.

The Passion Fruit.—We direct special attention to a well-informed article on page 251, dealing with this growth. It is indeed curious that the passion creeper should be allowed to run wild, instead of being cultivated for the excellent flavour of its fruit. The taste of the latter is, however, an acquired one; and its votaries are not over numerous. Hence, we think, arises the inattention the passion fruit has received.

HAPUGAHALANDE TEA COMPANY.

ANNUAL REPORT.

Acreage :—

Tea in full bearing ..	235 acres	
New clearings ...	150 ,,	
Jungle &c. ..	369 ,,	1r 3p
Total estate ...	754a	1r 3p

Your Directors beg to submit their annual report and accounts for the twelve months ending 30th June, 1899, which they trust may be considered satisfactory.

The quantity of tea manufactnred for the season (including estate and bought leaf, but exclusive of that manufactured for other estates) was 138'750lb.

Estimating the unsold tea at a safe valuation, and exclnding a snrplns of R290·91 on previous crop, the nett amount realised for this product totals R47,960·02, being an average of 34·57 cents per lb.

After setting aside R2,641·28 for depreciation on bnildings and machinery, the sum available for distribution (including R123·61 brought forward from last account) is R23,134·41. From this sum the directors recommend payment of a dividend of 12 per cent, absorbing R20,400 and leaving R2,734·41 to be carried forward.

In terms of the Articles of Association Mr. Keith Rollo retires from the office of director, but being eligible, offers himself for re-election.

The appointment of an auditor for the current season will rest with the meeting.

PRODUCE AND PLANTING.

The Outlook for China Teas.—Consnlar reports from the Celestical Empire are not encouraging as regards tea. A report from Kiukiang remarks : Tea shows (for 1898) an improvement as against previous year's statistics, bnt the total falls short of what it used to be in former years, and British merchants are not sanguine as to the future. Ningchows until of late years were the favourite Russian teas. Recently, however, Keemuns seem to compete with them for Russian favonr especially in the finest grades, and this, combined with low exchange, has consequently driven prices up. This is probably cansed by the Russian taste following the British. and preferring stronger liqnory teas, and is leading them to take more and more British-grown tea each year. It looks as if Russian reqnirements wonld prevent any further falling-off in prodnction. Export to the United Kingdom, however is steadily shrinking, and threatens to become nominal. The taste of the British public in the matter of tea has nndergone a marked change of late years, says the Consul who is undoubtedly right, and consumers have no appreciation of light flavoury teas such as China produces. The introduction of machinery might revive the trade with England and the colonies, but this seems as far off as ever, the Chinese being quite satisfied with the prices paid for their tea preprepared according to their own methods.

China Green Tea.—After all that has been said against the colouring of green tea leaf, the Chinese growers and manufactnrers do not find much encouragement in abandoning the use of colouring matter for the United States market. The British Consul-General at Shanghai, Mr. Brennan, tells us that dnring 1898 the green tea market was subject to unusual depression in consequence of a duty of 10 cents being imposed in the United States ; stocks already in the States were exempted from this duty, and as large stocks of old tea were held, duty-paid teas had no chance till the existing supplies were exhausted. The Pingsuey teas were the purest and best that have been brought to market for thirty years, and yet they met with a poor reception in America. This is partly attributed to the absence of colouring matter, which caused the leaf to be unattractive to the eye. "Seeing that the tea is only wanted for making an infusion, and not for putting on the table in the shape of leaf, it is strange that consumers do not prefer to have the pure uncoloured leaf as it is used by the Chinese themselves. Colouring enables the tea-curers to hide defects which wonld otherwise be exposed." The crop was 80,000 half-chests, against 112,000 half-chests last season. In country teas (Tienkais Moynnes, and Fychows) transactions were not profitable. Most of these teas lost in America, and barely paid first cost in England. The crop is reckoned at 177,000 half-chests, against 192,000 half-chests in the previous season. In Hysons the competition to secure the choicest teas for the Central Asian markets, via Batoum, forced prices up to an nnprecedentedly high point, 60 to 65 taels being paid for teas which usually fetch from 35 to 45 taels. The Central Asian markets promise to become important consumers of all kinds of green teas. Much dissatisfaction was caused by the arbitrary rejection on the part of the United States Customs inspectors of teas which were "perfectly pnre and unadulterated, but which failed to come np to the requirements of the Government standard." The season opened on May 18, but business in black tea was restricted till the second week in July, when a fair business was done in second-crop Keemnns ; and these have been the only varieties that have given satisfaction. In common teas business was very dragging throughont the year, although prices were 15 per cent over those of last year. In volnme it was the smallest for the last twenty years, the settlements being 37,000 half-chests, against 68,000 half chests the previous season. —*H. and C. Mail*, July 28.

CLUNES ESTATE CO. OF CEYLON, LD.

ANNUAL REPORT.

Clunes Division. *Supt.*—T S Luce, Esq.	Acres.	Erracht Division. *Supt.*—C F S Shaw, Esq.	Acres.
Tea in bearing ..	340	Tea in bearing ..	365
New clearings ...	50	Tea planted 1896-7	50
Forest	174	,, 1898	92
		Forest & Waste Land	246
Total ..	564	Total ..	753

Grand total 1,317 acres.

The Directors now submit to the Shareholders the Accounts and Balance Sheet of the Company for the year ending 30th June, 1899.

The crops secured amounted to 395,486 lb tea, as against 395.535 lb last year, being 4,514 short of the estimate. The nett average sale price was 34·29 cents per lb, the cost laid down in Colombo being 20·29 cents per lb, both of which figures the Directors consider may be deemed satisfactory.

After providing for Depreciation of Bnildings and Machinery, the result of the year's working shews a nett profit of R38,142·30 equal to 11½ per cent on the paid np Capital of the Company. To this must be added a balance of R4,413·87 brought forward from last year making the total at credit of Profit and Loss Account R42,556·17.

Out of the above profit the Directors recommend that R12,500 be transferred to an Extension Fund Account to provide for the capital already spent in opening clearings, and extending Factory accommodation, which has hitherto been financed by loans.

They further recommend that out of the balance then available a dividend be paid for the year of 8 per cent on the paid up capital which will absorb R26,560, leaving R3,496·17 to be carried forward to next year's account.

The estimate for the 1899-1900 season is 430,000 lb tea against an expenditnre on Working Account of R92,311.

The estimated expenditnre on capital account amounts to R5,596, mainly for upkeep of yonng clearings, to provide a new sifter for Clnnes and improvements to the cart road to facilitate transport from this estate.

During the year Mr. S. L. Harris resigned as he was leaving the island and Mr. W. J. Smith was appointed to fill the vacancy on the Board.

In terms of the Articles of Association Mr. V. A. Julius now retires from the Board but is eligible for re-election.

The appointment of an Auditor for the current year will rest with the Meeting.

COOLGARDIE EXHIBITION AWARDS.

TEA, COFFEE, COCOA, ETC.

Blended teas, pure Ceylon, Ch. and A. Bohringer, extra special 1st; Lethenty Tea Estates Ass., Ltd., special 1st; W. Paterson and Co., Frementle, Diamond Jubilee brand 2nd. Blended Indian and Ceylon—Amgoorie, Fowler and Co., 1st and 2nd. Blendid China and Indian—Viking brand, G. Wood, Son and Co. Frementle, 1st. Low Grown—Nahalma Estate and Eila Estate, 1st each. Green Teas—Hyson, Brunswick Estate, Ceylon, special. Highgrown Teas—Brookeside Estate, Talawakelle Estate, Hornsey Estate, Dotala Estate, Ormidale Estate, Sutton Estate, Oliphant Estate, Diyagama Estate, Excelsior Estate, Concordia Estate, Holmwood Estate, 1st each; Carolina Estate, Minna Estate, Fairlawn Estate, Alnwick Estate, Brunswick Estate, Dambatenne Estate, 2nd each. Pure Ceylon Teas—Fancy teas, golden tip, Lipton's Dambatenne Estate, Ceylon special. Coffees.

Ground Coffees—Amgoorie, Fowler and Co., 1st and 2nd; G. Wood, Son, and Co., 3rd.

Essence of Coffce—Symington, 1st. Coffee, Raw, Arabian—Lipton's Dambatenne Estate, 1st.

Cocoa.—Raw Cocoa—J. H. Parber, The Grove, Ukuwela, Ceylon, 1st; Lipton, Karandgalla Estate, Ceylon, 2nd.

Cocoa Prepared.—Taylor Brothers, London 1st, Fry, London, 2nd; Taylor Brothers, London, 3rd; Desiccated Coconut.—Orient Company, Limited; Colombo, Ceylon, 1st; J. W. C. De Soysa, Colombo, 2nd.

Cinnamon Quills.—Orient Company, Limited, Colombo, Ceylon, 1st; J. W. C. De Soysa, Colombo, 2nd.

Cardamoms (Mysore Variety.)—Galentenne Estate, Ceylon, 1st.

Cinchona Bark.—Ch. and A. Bohringer, Colombo.

Annatto Paste—Bixa brand, A. Van Starrex, Crystal Hill Estate.

Coir yarn, Clarke, Spence and Co., Colombo, 1st and special; Orient Company, 2nd. Coir bristle fibre, Orient Company, 1st. Palmyra fibre, Orient Company, 1st. Kitool fibre, Orient Company, 1st. Mattrass fibre, in ballots, Orient Company, 1st.

Display of photographic work, A. W. A. Plâté and Co., special 1st; Colombo Apothecaries' Co. 2nd.—*Perth Morning Herald.*

THE COFFEE CROP IN COORG.

A forecast of the coffee crop in Coorg for 1899 has been received from the local Administration, and the figures are appended, together with those of the estimate of 1898, for comparison:—

	1898. Tons.	1899. Tons.
Estimated yield (2 cwt. an acre for Europeans in 1898 and 1½ cwt. in 1899)	2,730	2,089
Estimated yield (⅓ cwt. an acre for natives in 1898 and ¼ cwt. in 1899)	1,470	683
Total	4,200	2,772
Estimated average yield per acre of ordinarily well cultivated coffee in full bearing	3 cwt.	2 cwt.
Export of coffee taken from the toll gate returns ...	2,462 tons	4,134 tons
Average annual export of coffee in the ten preceding years	3,189 tons	3,326 tons

Taking the average annual crop at about 5,200 tons, the forecast of 2,772 tons for the coming season represents 53·3 per cent, against 79·2 per cent in 1898.

THE PASSION FRUIT.

ITS VALUE FOR LOCAL USE AND FOR EXPORTATION.

The lowcountry of Ceylon generally fares better in the matter of fruits than upcountry estates do, the former claiming such delicious fruits as mangosteens, mangoes, durians, and pineapples, all of which are now more or less in season While fruits of temperate countries, such as apples, pears, peaches, &c,, have refused to thrive to any extent at elevations of 4,000 feet to 6,000 feet, the Passion-fruit not only thrives exceedingly well there, but has become practically naturalised, being apparently as much at home as in its native country, Brazil. No other exotic fruit—and the Upcountry native fruits need hardly be taken into account—thrives here with such luxuriance as this, and probably also no other fruit would better repay systematic cultivation on upcountry estates. Indeed, it is but little cultivation that is required, judging by the way the Passion-fruit, having escaped from gardens and estates, grows wild in ravines and by the sides of streams at fairly high elevations—creeping among tall-growing grasses or climbing over shrubby trees, with its dark-purple tempting egg-shaped fruits bringing moisture to the teeth of those passers-by who know its delicacy.

The plant, however, is hardly, if at all, productive at elevations under 3,000 feet, but it is surprising that its fruit is not seen in larger quantities in the lowcountry markets. It only requires to be appreciated, and few who taste it but will not pronounce it delicious. Besides being an excellent fruit for local consumption, being palatable and most refreshing in itself and makes a delicious Jam, it is also of commercial importance. In Australia it is cultivated, and fairly successful trial shipments of it have recently been made from there to London, with a view of establishing a new industry. Notwithstanding the wrinkled appearance of the fruit on arrival in London owing doubtless to the long voyage, some were sold for as high as one shilling per dozen. An impetus is thus given, it appears, to its cultivation in Australia, and further shipments thence are promised, it being hoped that the heavenly-fruit (as the Passion-fruit there is sometimes called) may become as important an article in the export fruit trade as the Australian oranges now are. Our Australian cousins are thus aware of the wisdom of not having all their eggs in one basket, though as a matter of fact they produce already in their various latitudes almost every product it is possible to mention, from gooseberries and strawberries to grapes and coconuts; also cacao, coffee, &c.

At the higher elevations in Ceylon the conditions of climate and soil are obviously most congenial to the Passion-fruit, so that here its cultivation

should be easier and its crops less precarious than would be the case in countries where less favourable conditions obtain. Ceylon is only about half the distance from London that Australia is, so that the fruit from here could be landed in London, by means of steamer cold storage, in a comparatively fresh condition. Labour here is also relatively cheap. There would thus appear to be favourable prospects of the Passion-fruit becoming an important article of export in the island. Upcountry planters have frequently remarked on the enviable and neglected advantages of the lowcountry for producing the choicest fruits, both for export and for local consumption, but now that they have the monopoly themselves of so fine a fruit as the Passion-fruit, it is to be hoped they will not long show the same vein of apathy as their lowcountry brethren.

Those who are not acquainted with this plant may be interested to know that it is a climber, belonging to the same genus as the Granadilla, which has a much larger but inferior fruit and thrives only in the lowcountry. The former has also very ornamental foliage, and makes a handsome and quick-growing screen over fences, palings, &c.

The fruit, when obtainable, is often recommended as a special delicacy to invalids and convalescents, and is said to be also used in medicine. A most palatable way of taking it as a dessert is, to empty out a few of the fruits into a tumbler, adding a pinch of carbonate of soda, also some sugar or sherry, according to taste (although some prefer eating the contents as they are from the shell); then stir it up briskly. It may also be made into a delicious jam, in this case the shell and all being used.

The name *Passion-fruit* is a derivation of "Passion-flower" (the flower of the same plant), which is so named on account of the supposed resemblance of its component parts to the Crucifixion, the various parts representing the "crown of thorns," the ten Apostles and Peter and Judas, the "scourge," &c. The fruit was formerly called Sweet-cup, which is a more appropriate and a better name.

UNITED PLANTERS' ASSOCIATION OF SOUTHERN INDIA.

Bangalore, August 14th.—A conference of the United Planters' Association of Southern India assembled here to-day in the Cubbon Rooms, the delegates present being:—Central Travancore, Mr G Acworth; Coorg, Messrs W H Sprott, A Lambert Murray, Aynsley; Kanan Deven, H Knight; Nelliampathies, Mr J Ahott; Nilgiris, Messrs Hodgson and Edmiston; North Mysore, Messrs Scott, Skirving, and Parsons; South Mysore, Messrs Grahame-Anderson, Horne, Crawford, Park, and Playfair; Shevaroys, Messrs Lechler, Messrs Gompertz: Wynaad, Mr Kockin.

Committee work occupied from 10 o'clock till 1. At 2 the Agenda was taken up, the Secretary's annual report and Statement of accounts being duly passed.

THE CHAIRMAN'S ADDRESS.

The Chairman (Mr. George Romilly) delivered his address. He said:—The Secretary has told you in his Report, clearly and concisely, about all the work that the Association has carried out during the past year, but naturally does not touch on those subjects in which, although they affect our interests, we have not been actively engaged. I will in consequence confine my opening remarks to these matters and in the forefront stands out the great question of exchange.

THE CURRENCY QUESTION.

A strong and impartial Committee has given its verdict in favour of an attempt at a gold currency and a 1s. 4d. rupee, and this notwithstanding that our plea for re-opened Mints was backed up not only by all other *bona fide* producers, but also by the leading exporting and importing merchants, and a vast amount of evidence was given in favour of this view. It seems to have been a fight between conflicting interests, the trade and people of the country on one side and the Government and their supporters on the other. The evidence of the experts was pretty equally divided. Unfortunately for us, Government has won, and we must accept the verdict. I don't want to dispute it, but I want to call attention to one or two points that seem to me worthy of study. The whole trend of the evidence, from Lord Northbrook on the Government side to the most ardent of our own supporters, seemed to be that the prosperity of the country depended on its exports, and that nothing must be done in the way of export duty to check exports. This seems to be a generally received axiom and the logical conclusion would be that some recommendations would be made, whereby exports might be stimulated. But instead, they are left to do the best they can for themselves under a crushing, but indirect tax. Another argument, which seems to me anomalous, is that export must be encouraged but only moderately, for if there is an excess of encouragement, overproduction ensues. Now I will give you an illustration of these two theories in one of our own trades. Our coffee has been competing with the produce of a country where production has been stimulated by abnormally low exchange and where, in consequence, over-production has ensued—I speak of course of Brazil. Now, who in this case are the real sufferers? Profits in this country among coffee planters have, in recent years with high exchange ruling, been small and now, except in especial cases, are none-existent—in fact many of us will have to face a loss in the coming year. Things will right themselves, no doubt, but in the interval the unfortunate Indian planter has but little saved wherewith to tide over the bad days. Against this take the case of the Brazilan. Even supposing that he can no longer harvest and ship at a profit, let alone his cultivation expenses, he has been steadily making four years past abnormal profits owing to a falling exchange, and if he has been a sensible man and foreseen the undoubted fall in prices that must follow on over production, he has saved his profit and now has capital to turn into other channels. If this logic is right, poor India, you will admit, is the greater suffer. I don't for one instant deny that unnatural profits, owing to a falling exchange or indeed owing to any other cause, will bring capital rushing into the enterprise and lead to eventual over-production, but in the meantime the producer is laying up for himself the wherewithal to face the catastrophe, and profits and capital in the country are accumulating. Another argument that has been brought up before the Committee is that a fixed exchange will attract capital, and I suppose from their recommendations that they have accepted this as correct. It may be so, but I cannot myself understand why the mere fact of being able to withdraw your capital at a fixed exchange should attract it for long investment when profits have been reduced to a minimum. I have always regretted that native public opinion was not more forcibly expressed over this currency question in India, as it was in Ceylon.

THE FIGHT IN THE TEA TRADE.

First as regards the fight in the Tea trade that has recently been going on. We were not consulted by the Indian Tea Association, as of course our interests in the Tea trade are too small to influence the position, so I do not know how negotiations were carried on before the deadlock, but judging from what one can read in the papers it does not seem to me to have been good generalship. Of course our sympathies must be with the Indian Tea Association in their demand, as doubtless the distributors and grocers can very much better afford to loss the 1 lb. draft than the unfortunate producers can; but yet, if that was all that was

in dispute, it seems to me a pity that the compromise now effected was not arrived at by a little more negotiation, instead of plunging into so bitter a contest with our best customers.

COFFEE PRICES.

The fall in coffee prices during the past year has been, I tbink, quite unprecedented, aud I fear that many a one among us, who at this time last year counted on a good profit, has bearly paid his expenses The extraordinary variation in prices, too, is somthing new to us and shows, I think how little can be done on the lines suggested by Mr. G. Anderson in his speech last year on the classification of coffees. The fact is that when a market is glutted with a produce, the buyers get fanciful, and fashion rules the price. In former years, and even until quite recently, the demand was for peaberry and colour coffees, but this year it seems to have been entirely for size, and coffees of the same mark have varied quite £40 a ton between the prices paid for their A and C sizes. However, any one who has read " Planter's" cogently reasoned letters to the *Madras Mail* will agree with him that the crisis has been reached and that we shall very shortly begin to recover.

CINCHONA.

The same improvement in prospects may also be predicted, I think, for the small band of cinchona planters. As you are doubtless aware, Mr. Hodgson, to whom our thanks are due, was intstrumental in getting the Madras Government to sent their director of cinchona gardens, Mr. Standen, to Java to report on the cinchona trade of the island. Mr. Standen has now come back full of valuable information which you will doubtless find in his Report. It seems to me that tbe ball is now at the foot of the Java planters. If, only they will combine now and restrict their output instead of rushing it forward, as they have been doing during the last 12 months, they can rule the price in the European markets. An eventual rise is a cetainly and the longer it is deferred by these abnormal harvest, the greater must be the re-action.

ELECTION OF OFFICE-BEARERS.

The meeting then proceeded to elect office-bearers for the ensuing year.

Mr. Sprott was unanimously elected Chairman.

Bangalore, 15th Aug.—The delegates met to-day at 11 a.m. when Dr. Lehmann, Agricultural, Chemist to the Mysore Government, aud Mr. J. Cameron, the Mysore Government Botanist, were present by invitation. The sitting was accordingly devoted to discussing agricultural questions. Proceedings commenced by a number of subjects being added to tbe Agenda paper, after which the Chairman welcomed Dr. Lehmann :—

Fertilisers.

The Chairman asked Dr. Lehmann to address the meeting in connection with bis experiences in reregard to coffee.

Dr. Lehmann said that he had no experience in regard to coffee except tbe little he had acquired during his tours. If the meeting, however, wished him to say anything, he would prefer to speak on the subject of fertilisers.

The meeting having notified its willingness to hear what Dr. Lehmann had to say on this most important subject, he said :——I have first of all to thank you most cordially aud sincerely for your kind invitation asking me to be present at this meeting to-day. I am but a novice among you, as I have had but little experience in coffee, but I shall try to study the subject as much as I possibly can I do not want to lay any remarks before you that are not based on experieuce or experiment, and I do not want to give any assurance or opinion that is not based on knowledge. I hope therefore you will excuse me if I do not touch upon coffee questions, such as leaf disease black rot, &c. because although I have seen something of them, I have formed vague ideas as to how we are to set about discovering a remedy, and I have as yet been unable to try them, and before I have tried them, I should not like to say anything on the subject. I have not been long enough in the country to establish a library or a laboratory, and without these a chemist is almost as much at sea as a captain of an ocean vessel is without his compass and chart. You will understand how diffident I am in addressing you just now on the subject. The climate of Germany is totally different from that of this place and the crops too are very different, aud I require time to study the subject carefully before pronouncing an opinion. A subject, however, that will interest you very much is that of soil analysis. It has almost been looked upon as a panacea for all ills that crops are heir to unfortunately I cannot quite agree with that. Soil analysis is very valuable, indeed it is absolutely necessary for making experiments, but it won't tell you everything. Soil analysis is not advanced enough for us to tell you what constituents of the soil are really directly available by the plant Chemists are striving to attain that end, but they have not attained it yet. There are a large number of experiments beiug tried, and each chemist may think that he has overcome the methods that can be employed but unfortunately all other chemists think the same. The great difficulty in studying the soil at all depends on the mechanical conditions taking place in it as well as its chemical constituents. Mechanical conditions have a great deal to do with it, but some of the matter is such that we can't easily ascertain its physical attributes—as for instance the distribution of the plant and the fineness of the soil. The fineness with which the plant food is distributed is an essential factor as I shall point out when I am talking of fertilisers. Then another matter which affects the growth of a plant is the nature of the plant itself. All plants have not the same ability to absorb plant food. Some plants may be peculiarly adapted to particular forms of plant food. The Leguminosæ always appear to be absorbing potash, although they contain a large amount of nitrogen ; still virtually what they require is more potash than nitrogen. In the same way with the Grammaciæ; they contain but little nitrogen, and yet they are peculiarly beuefited by a nitrogen fertiliser. What is the particular fertiliser that is beneficial to coffee. What particular plant food coffee has a tendency to absorb from the soil is a question that will have to be solved and presents very considerable difficulty. Again, climate affects the productiveness of the soil to a large extent. The climate here is different to that of countries in which agricultural chemistry has made the most rapid advances and in which it has been reduced more to a science than it has elsewhere, so we cant apply what has been discovered there directly to our conditions here. So we are placed in peculiarly trying circumstances. We are beginning afresh to find out what can be used. What has been used is a guide, but it is not an infallible guide, and we must go carefully and cautiously. In regard to fertilisers there is some peculiar idea—some want of accuracy if I may say so—in regard to the relative values of soluble and iusoluble fertilisers. As regards the value of superphosphates and fine ground bones, I may say that the chief value of superphosphates over ground bones is that superphosphates is soluble and percolates through the soil with the rain and soil water. The advantage of a soluble fertiliser is not that the plant can absorb it in a soluble form but that in that form it spreads and mixes more intimately with the soil and the plants roots can get at it better. I might illustrate this by, an example. If we take a piece of sugar candy and put it in water it dissolves very much more slowly. If however, we grind the sugar candy to a powder and put into water, it will dissolve very much more quickly. The same arguments hold good with regard to soluble manures, the rain and soil water dissolve them more rapidly and mix them more intimately with the soil. I wish to bring this point before you in a practical way in regard to the fertilising of your fields. I have seen in my tours in some instances, say, basic slag used. A little brow-pit is made near the coffee and

the fertilisers dumped in an covered up. Now for all practical purposes that is like what the natives of this country do with their gold, they bury it instead of putting it into a Bank. The plant may make use of that fertiliser but only in a long course of time. But if, on the other hand it is spread finely over the surface broadcast and then dug into the earth, the plant would be in a better position to get at it than if it was covered and hoarded up. Of course there is no rule without an exception. There may be steep lands on which you are using a comparatively easily soluble manure where it might be necessary to make a browpit and bury the fertiliser, but whenever it can be done, by all means always broadcast your fertiliser ; then when you dig it in the plants get at it more easily than when it is heaped together in a pit. A matter which also is of great interest to you is the use of saltpetre. Saltpetre is a fertiliser which is beneficial no doubt, and you are fortunately located in being able to get it comparatively cheaply; but great care should be taken in its application. You should not apply it just before heavy rain or in the rainy season. Saltpetre, as you know, contains two of the three most important constituents of plant food, nitrogen and potash. Nitrogen in the form of nitrate washes into the soil readily, and if there is vigorous vegetation going on these nitrate will be absorbed by the plant and it is this nitrate which gives the flush of wood with the large deep green leaf. I am aware that my remarks are rather rambling, but before sitting down I would like to refer to the action of lime. Lime in the soil has a two-fold action. It serves the purpose first of a plant food, and secondly it aids in decomposition, not exactly in a chemical way but by combination with certain bacteria in the soil. Lime in the soil is almost absolutely necessary, as it helps very much in the process of uitrefaction—the nitrefaction of the comparatively inert nitrogen in organic matter in the humus into nitric acid which is absorbed by the plant If heavy rain comes, it has a tendency to wash the lime out of the soil ; but it always remains in the soil provided you have a sufficient amount of moisture and a sufficient amount of heat, of which there can be no doubt in this country. (Cheers).

The Chairman said:—It only remains for me to thank Dr. Lehmann very much for the most interesting little lecture he has given us. I am sure it has given us a great deal of iuformation and is the precursor of a great many more. The Mysore Province is bound to benefit very much by his residence in it.

Mr. Scot Skirving proposed and Mr. Hodgson seconded "That the U. P. A. S. I. send a cordial vote of thanks to the Mysore Government for appointing an Agricultural Chemist of such ability as Dr. Lehmann and thereby rendering a great service to the planting community of South India."

The Resolution was carried with acclamation.

Dr. Lehmann then made some further remarks on the proper method of condncting experiments with fertilisers and answered several questions put him by the Chairman and delegates.

LEAF DISEASE, ETC.

Mr. J. Cameron, the Mysore Government Botanist made the following remark :—This is the third, occasion on which I have been honoured in being invited as a visitor to this meeting. Needless to say, I am proud of the honour for which I thank you very much. I have embodied my view on coffee planting so recently in the form of a Report that there is a very little more to be said to-day. There are one or two things, however, which I omitted to put fully before you in the Report and for which I have been called to book more or less severely. One of these is that I took no notice whatever of the ripening and colouring of the berry, and also the colouring of the bean, which I understand is an important matter. I have repeatedly, during the last season's harvesting, seen that a great deal of green coffee has found its way into the market or which low prices were paid. Now, what was the reason for this green coffee being so abundant? It might be one of various reasons. It might be due to being plantod on high levels and a very wet season late in the year; it might be overcrowding or overshading and one or two other causes. Now, gentlemen there are things I would like you to take up practically. See if you cannot ripen your coffee more fully by given it a lighter shade. Of course you can't alter the rainfall or the season but by giving a lighter shade in the colder parts of country where the coffee is not likely to ripen well, you will be helping yourselves. In the same way you can help by draining the ground properly. Probably it is due to a want of drainage that you have some bushes which do not fully ripen. This question has to do not only with the ripening of the bean itself but also with ripening of the wood. There is a time of the year when you like to have your bushes more fully exposed than at any other time, and the wood at that time may be partially ripened or it may be fully ripened. It is important that it should be fully ripened if you wish to have not only a full crop but also ripened fruit which produces good prices in the market—fruit with a high colour and well formed. I will now mention another thing which I don't think I touched one sufficiently in the Report, namely, what practical steps should be taken in the matter of leaf disease. In travelling through Coorg last November, I fonnd the bushes were healthy looking and that they had an abundance of young healthy leaves and also an abundance of old leaves underneath piled one over the other and in some parts these were diseased and in others were showing signs of disease. Now I believe the old and partially decayed leaves which formed underneath in layers were carefully removed and burnt and the ground swept and the debris burnt, you would do much to suppress the disease. To enable you to do this thoroughly in a District like Coorg, you should have burning grounds, open spaces here and there in the marshes, where the leaves could be collected and burnt. If this could not be done, the next best thing to do is to collect the leaves in convenient sized pits and cover the whole thing over with caustic lime. If this was done it would prevent the spores of the disease being carried over the whole of your estate of your neighbour's. I don't think it would hurt the shrub to remove half the leaves, as it produces at the time new leaves very quickly. I don't think I have any more to say to-day, but before sitting down I would thank Mr. Graham Anderson for the kind way in which he has spoken about my report. I may tell you that I spent an enjoyable and instructive time in Coorg and should you wish me to visit any other District hereafter, I shall be glad to do so with the, permission of my Government (Cheers).

Mr. Sprott moved a hearty vote of thanks to Mr. Camerton for his interesting and instructive Report on his tour in Coorg and also for the instructive remarks he had just made.

The vote was carried with acclamation.

Mr. Cameron then gave a short account of some successful cross fertilisation experiments he had succeeded in making: and dwelt upon the importance of hybridisation, quoting from the remarks of the President at a Horticultural Conference which was recently in England.

Copra in Tonga Islands.—News from this islands dated July 4th says:—Copra is steadily coming in, and the statistics of this year—if the Government sees fit in its wisdom to compile any—will show a more satisfactory state of affairs than those of the last few years. The price is somwhat easier, the current quotation being about £10 at steamer's side; in Vavau it rules somewhat higher. Heavy and continuous rain has interfered much with the northern island, but the crop is excellent. Very favourable reports, too, come from the Niuas. Some 400 tons go to Messrs. Lever Brothers by steamer from the Tongan group. Shippers are still complaining of the unsatisfactory returns from fruit consignments, but they go on shipping.

PLANTING IN PERAK.

(From the Perak Administration Report for 1898.)

LIBERIAN COFFEE.—Continued and continuing low prices make this cultivation at present unprofitable. The natives are practically abandoning their small gardens, but European and Chinese planters are exhibiting the pluck of the old Ceylon planters and are planting up with Para and other rubbers, cocoanuts and other products, and waiting for better times for coffee. Probably greater care and more experience in curing and packing Native States coffee will eventually secure a better price for in the home markets.

PARA RUBBER.—This product is being cultivated to a large extent. From the Government gardens 32,000 seeds and 59,718 seedings were sold, and the Forest Department has extensive nurseries. The rubber flourishes in Perak, and the samples from the Government gardens obtained good quotations in London. His Highness the Sultan has applied for a reserve of 15,000 acres for Gutta Rambong, and proposes to form a company amongst native gentlemen.

SUGAR has received a considerable impetus climate, labour supply and silver-currency favouring it. Inclusive of reserves, 11,000 acres of land for sugar cultivation, in the Lower Perak District, were granted on special to the Penang Sugar Estates Company, which Company has also acquired a portion of the Gula Company's sugar estate in the Matang District and is buying up padi land, for sugar culture, from native owners. This Company is said to meditate inaugurating the central factory system, which had proved successful in the West Indies. Chinese planters have also acquired extensive areas for this cultivation in Matang, and are also buying up padi land from the natives.

COCONUTS.—This product has continued to be in favour with planters, and the establishment of a large mill and factory in Singapore will encourage the industry. During the year 3,280 acres of land for coconuts were alienated to a British concessionaire in the Lower Perak District, and Chinese and natives are extending their plantations, especially in Matang. The coconut palm flourishes luxuriantly in Perak, and is currently reported to be more prolific than in Ceylon. There has for long been a controversy as to whether sugar-cane can be grown in the neighbourhood of coconut palms without a danger of breeding the beetles which are so inimical to the latter. The Curator has recently published an exhaustive treatise on the subject, which goes to shew the innocence of the cane.

PEPPER.—High prices have encouraged natives and Chinese to re-open and extend their plantations. In Matang particularly there has been activity among the Achinese pepper planters.

RAMIE.—A considerable concession of land was made to some foreign concessionaires in the Larut District, but operations have not yet commenced. It is hoped that ramie may soon rank in the list of products successfully cultivated in this State.

RICE.—The Padi harvest was, on the whole a fair one. Krian still takes the lead, but the high price of rice has caused considerable extension of padi cultivation in the Matang, Lower Perak and Kuala Kangsar Districts.

IRRIGATION.—The Krian Irrigation Scheme, under consideration for some years past, is now under way. Mr. R O N Anderson, formerly Personal Assistant to the State Engineer, and since

appointed Irrigation Engineer, revised and completed previous reports and estimates, and a final report having been received from the Hon. A Murray, Colonial Engineer, Straits Settlements, whose services were kindly lent by His Excellency the Acting Governor, a provisional estimate of $656,000 has been sanctioned, and work has been commenced. The acreage commanded by the scheme is reckoned at 63,000 acres, and the estimate includes drainage and the supply of water for domestic purposes.

TEA IN THE PHILIPPINES.

Yet another rival for Ceylon is looming in the far future in the matter of tea cultivation. What place should this be, but those interesting islands, the Philippines, the resources of which have as yet been gauged only in a very small degree. The following cutting is one which appears prominently on the front page of the Manila *American*, of date August 9th:—

TEA CULTURE WILL BE TRIED.

A Chino named Yee Ah Hing, said to be a wealthy tea merchant of Formosa, intends to see if tea culture can not be profitably carried on in the Philippines. Conditions for the successful growth of tea plant are said to be fully as favorable here as in Ceylon. It is claimed that Yee Ah Hing is negotiating for a large tract of land on the island of Negros and will go into the business of raising tea there on a big scale.

But we learn, by the mail which brought the paper above-named, from a Manila gentleman formerly in Ceylon, that China teas will not make much headway if Ceylon seed is imported quickly. He says he has advised the Government not to allow the Chinamen to import China seed, owing to the inferiority of the tea grown in the Celestial Empire. He is himself importing good jât seed from Ceylon and will do his best to prevent the cultivation of inferior tea being inaugurated. If the Government at Manila are inclined to agree to this, Ceylon planters should have a good market for seed in that city, if indeed a few of the said planters do not go and start plantations at once, as soon as peace is assured over the bulk of the islands. Today Reuter's news is to the effect that General Otis has applied the Chinese exclusion law to the Philippines; and we presume that the Philippine Government will not be loth to act still further in the spirit of this regulation, and exclude the introduction of China tea for cultivation.

EILA TEA COMPANY OF CEYLON LIMITED.

REPORT.

The following is the directors' report:—

The Directors have to submit their Report and Accounts for the year ending 30th June, 1899.

The Crop on Eila Estate was 43,314 lb. and on Kanangama 4,160 lb. short of the estimates, but the unfavourable season may be considered to be the main cause of the deficiency. On Eila also the easy treatment of the bushes referred to in the last report has been continued.

The total amount of Tea manufactured was 357,852 lb. and the cost of production including the purchase of 101,299 lb. of green leaf was 23·06 cts per lb.

The average price of the Tea after estimating the value of that unsold was for the two Estates 33·11 cts. per lb. as against 28·58 cts. for last season. Every

effort will be made to improve the quality of the Tea and keep up the prices.

During the year £500 was repaid to the Standard Life Assurance Company on account of their loan of £7,000.

Your Directors regret that the R3,000 of Coast advances mentioned as doubtful in their last report have proved to be irrecoverable and this amount together with an irrecoverable debt of R488·38 on Kanangama Estate has been written off the Reserve Account.

The net profit for the past season, after writing off depreciation on Buildings and Machinery, is ..	R22,175·63
To which must be added the balance carried forward from last season ..	5,481·86
Making in all ..	R27,657·49
Out of this your Directors propose to pay a Dividend of 8% absorbing ..	R24,000·00
To grant a bonus to the Superintendent of Eila of ..	750·00
And carry forward ..	2 907·49
	R27,657·49

The Estimates for the current season provide for a crop of 391,000 lb. of Tea at a cost of R86,736·70.

The Estates of the Company on June 30th, 1899, consisted of—

Eila—564 acres Tea 5 years old.
62 " " 3 "
90 " " 2 "
240 " Forest.
956 acres.

Kanangama—215 acres Tea 5 yrs. old and upwards.
108 " Chena and patana.
323 acres.

During the year Mr. F. W. Bois was elected to the Board of Directors in the place of Mr. H. G. Bois who has left the Island.

Mr. Giles F. Walker retires in accordance with the Articles of Association, but being eligible offers himself for re-election.

The shareholders will have to appoint an Auditor for season 1899-1900.

NEW TEA COMPANY.

(*Investors' Guardian*, Aug. 12.)

Galkandewatte Tea Co., Ltd. (63,189).—Registered Aug. 2nd, with capital £21,000 in £1 shares to acquire lands and buildings in Ceylon or elsewhere, and in particular the Galkandewatte Estate, in the Dimbula District, to adopt an agreement with J. Tilly and J. D. Ellershaw, and to carry on the business of planters and growers of tea, coffee, cocoa and other crops. The subscribers are:—

	Shares.
J. Tilly, 48 Kimbolton Road, Bedford, tea planter	1
J. Ellershaw, 79 Queen Square, Lancaster, draper	1
A. T. Johnson, Rayne, Essex, gentleman	1
Mrs. L. Tilly, 48 Kimbolton Road, Bedford	1
Mrs. J. Jowett, 5 Gosvenor Road, South Norwood	1
Mrs. A. Johnson, Rayne, Essex ...	1
Miss M. E. Tilly, 48 Kimbolton Road, Bedford	1

The number of directors is not to be less than 2 nor more than 5; the first are J. Tilly and J. Ellershaw, senior: qualification £500; remuneration £50 per annum dividend. Registered office, Howard Chambers, Mill Street, Bedford.

THE LONDON CUSTOMS' SYSTEM OF WEIGHING CEYLON TEAS.

UNDER THE NEW REGULATION EXPECTED TO COME INTO FORCE ON OCT. 1st, 1899.

(*Instructions showing how to prevent a loss on Garden Weights.*)

At the settlement of the recent dispute between Growers and Buyers, the Joint Committee of the Growers and Buyers' Associations arrived at the following decision with regard to the *Weighing of Tares.*

"If the empty package weighs an even pound it is to be entered as such; if it weighs an even half-pound or over it is to be entered as the next pound above, and if it weighs less than half a pound it is to be entered as the pound below; boxes are to be weighed and tared as heretofore."

In order to fully benefit by the above change from the system of weighing now in vogue by the London Customs' Authorities, the following hints will prove of value to Proprietors and Superintendents of Estates.

1. The Customs will in future give the turn of the scale on the *Gross against* the Importer, but on the *Tare* either *for or against* the Importer when it weighs under or over the half pound.

2. The *Tare* (that is the weight of the empty package, complete with lid, lead, hoop-iron and nails) *should weigh four ounces over the pound*, whether the package be chest or half-chest.

3. The *Gross Weight* of a package *must in all cases weigh four ounces over the pound*, whether the package be chest or half-chest.

4. Subjoined is an example of the *correct* method of weighing a package containing 100 lb. of Tea.

Garden Weights, Ceylon.

Tare.	Tea Net.	Gross Weight.
27 lb. 4 oz:	100 lb.	127 lb. 4 oz.

Customs' Weights, London.

Gross Weight.	Tare.	Net.
127 lb.	27 lb.	100 lb.

From the above it will be seen that a margin of 4 oz. remains for any slight variations in weight of package during transit, and that *no loss* need result from the Customs' Weighing under this system, whereas, now a minimum loss of 5 oz. per package is unavoidable.

5. Should the present system of weighing in Ceylon be continued after the new regulations has been put in force by the London Customs the following would be the result.

Garden Weights, Ceylon.

	Tare.	Tea Net.
No. 1.	27 lb. 14 oz.	100 lb. 5 oz.
No. 2.	27 lb. 9 oz.	100 lb. 5 oz.

Customs' Weights, London.

Gross. Weight.	Gross Weight.	Tare.	Net.
128 lb. 3 oz.	128 lb.	28 lb.	100 lb.
127 lb. 14 oz.	127 lb.	28 lb.	99 lb.

No. 1. Shews a package, correctly packed under the old system, and shows a loss of 5 oz. but No. 2. incorrectly packed, would result in a loss to the grower of 1 lb. 5 oz.

6. It is most important that the weights of the Weighing Machine, used on the Estate, should be constantly checked and for this purpose a set of test weights should be kept—A beam scale is to be preferred to a platform one, as the former is the more accurate.

7. When a Superintendent, to equalise the tares of his package, adds pieces of lead or wood for that purpose, the material so added should be fixed inside the package, so as to prevent it falling out when the package is opened in London.

8. A Superintendent may "tare" and pack his teas with the greatest care, but if he afterwards permits his Carpenter to plane away from the top of the package before nailing down, all his careful work may be wasted.

The METROPOLITAN BONDED WAREHOUSES, Limited,
Crutched Friars,
London, August 1899.

N.B.—These Instructions revoke those issued by us in June 1898.

THE RECENT TEA DISPUTE.

Comments, by some importers of Ceylon Teas, on proposed settlement of Tea Dispute, as given in the Joint Committee's Circular, No. 17, dated 2nd August, announcing an "agreement with the Buyers' Association" as a settlement of the question of the abolition of the 1lb. draft on Tea, to come into force 2nd October.

No. 1—1 lb. Draft to be allowed as heretofore—the first stipulation!

No. 2—Gross weights to be taken and recorded as at present.

That is, ounces above a number of pounds to be ignored; *e g.*, 77 lb. 14 oz. gross will still be recorded as 77 lb. only.

ALTERATION IN WEIGHT OF TARES AS FOLLOWS:—

Clause a—If the empty package weighs the even pound it is to be entered as such.

Clause b—If it weighs the even half-pound or over, it is to be entered as the next pound above.

Clause c—If it weighs below the half-pound, it is to be entered as the pound below.

This will be a gain to some growers to the extent of, perhaps, ¼ lb., as hitherto 1 oz. extra has counted as an additional pound in tare weights.

Clause d.—No "overtakers." No explanation of this Clause.

Clause e.—Boxes to be weighed and tared as heretofore to the pound weight.

Clause f.—Increase of number of Tarers for Factory Bulked Teas as agreed upon.

Any increase of number of tarers (at present it is 1 in 10, or 10%) means increased cost of turning out additional packages and increased risk of the tares taken varying more than the Customs' limit of 2 lb., necessitating the whole break being tared separately.

The Joint Committee might have said who called for the change, and in whose interests. It seems only in the interests of the warehouses.

Clause g.—If parcels are bulked in London separate Tare must be taken of each package.

At present "average Tares" taken are allowed to stand, even though the teas be afterwards bulked.

The change will put an end to the advantage gained by having average tares taken of London bulked Teas, and will increase the charges considerably.

Teas which are not Estate bulked or are insufficiently bulked on the Estate and require bulking here, will in future, under the new regulations, incur an extra charge of 5d for chests and 4d for half-chests, for cost of separate taring, thus increasing warehouse charges 10 per cent., and costing the Garden extra about ⅝ per cent. on value of Tea.

No reason or explanation is given for this new heavy charge, or any hint why the change is made. It seems made in mere wantonness or in crass ignorance of the trade. The Tea buyers will not gain; the Tea producer certainly loses; but it will put money into the pockets of the warehouse-keepers. It is, at all events, difficult to see why "the Joint Committee," supposed to be acting in the interests of Tea producers, should now insist on a separate tare being taken of each package (*e.g.*, in a case of a Tea shipment in Venesta or other packages running even and weighing exactly the same), except to increase warehouse charges. The Estate proprietor, to avoid the increased charge, will have to bulk on his Estate, whether he considers that desirable or undesirable, and in many cases will have to increase his factory accommodation at some cost. It will fall heaviest on those who can least afford it; and after the outlay has been incurred to enable factory bulking to be carried out. Tea buyers who have paid too much may dispute the factory bulking; and the cost of bulking and taring will still fall on the Tea producer.

THE QUESTIONS ARISE—who is this Joint Committee, and who appointed it to deal with the alteration in weight of Tares?—and as there is a Tea and Produce Committee of the Ceylon Association, why was not that called together to discuss a matter so affecting it, and, further, is this agreement binding in any way or degree on Importers of Ceylon Teas?

If the Ceylon portion of the Joint Committee are now in some way authorised to bind Importers of Ceylon Produce, without consultation or asking their assent, cannot the Ceylon Association be at once called together to withdraw the authority before the Committee perpetrate further mischief on the Ceylon Trade?

10th August.

ST. HELIER'S TEA COMPANY, LD.

REPORT OF THE DIRECTORS.

ACREAGE.

250 acres	in bearing		
29 do	planted	in	1896.
34 do	do		1898.
313 acres			
114 do	Jungle, &c.		
Total 427 acres.			

The Directors have now the pleasure to submit their Seventh Annual Report to the 30th June last, which they trust will be considered fairly satisfactory by the Shareholders' shewing as it does a nett profit of about 10 per cent on the year's working.

The crop which was estimated at 95,000 lb. of made tea to 30th June, has turned out only 89,973 lb. and has realised an average price of 38·69 cents per lb., against 36·21 last year.

The cost of the tea in Colombo, exclusive of the sum of R2,438·74 expended on Capital Account, works out at 25·56 cents per lb. as against 25·24 cents per lb. last season.

The balance at credit of Profit and Loss Account, after writing off the sum of Rs. 1,618·42 for depreciation of buildings and machinery, but including the sum of Rs. 1,203·11 brought forward from last year, amounts to Rs 5,205·42; and out of this sum the directors recommend that a dividend of 9 per cent be declared, absorbing Rs. 4,500·00, leaving the sum of Rs. 725·42 to be carried forward to next year.

Mr. Percy Bois retires from the board by rotation, but being eligible offers himself for re-election.

The Shareholders will have to elect an Auditor for season 1899-1900.

NYASSALAND COFFEE CO., LTD.

The report was as follows:—

ACREAGE:

10 acres Coffee planted Dec. 1895.
240 do do 1896—Feb. 1897.
383 do do 1897—Feb. 1898.
———
633 acres under cultivation.
2,843 acres reserve.
———
Total..3,476 acres.

SUPERINTENDENCE.—Mr. Moggridge tendered his resignation as Superintendent, under his agreement, which the Directors have now agreed to accept, being satisfied with the arrangements that gentleman has made for the working of the estate during Mr. Robin's absence on furlough.

The thanks of the Shareholders are due to Mr. Moggridge for the work he has done, although the Directors are of opinion that he did not attach sufficient importance to the advisability of opening with large enough plants.

Mr. George Napier Barclay whom Mr. Moggridge appointed to act until Mr. Robin's return is reported as being a coffee planter of many years' experience in the Wynaad; and judging from his letters and that of the Visiting Agent, Mr. Henry Brown, to the Company, the Directors are of opinion that the estate is in capable hands.

PROGRESS OF WORK.—During the financial year under review no more land has been opened, the energies of the Superintendents having been devoted to supplying.

This work has been completed, although it is a matter for regret that the plants which had to be put out were of small size.

However, Mr. Barclay in his last letter dated 7th June, 1899, states: "The young clearings are looking remarkably well and have made wonderful progress the past month. I think that all plants alive now may be calculated to survive the hot weather, if we have any, there being no indication so far of the present weather changing."

During the season a small crop of 341 bushels cherry was picked and sold in the cherry at 6s 6d per bushel to a local trader. Of this Mr. Barclay remarks:—

"The coffee I am pleased to say is of exceptionally good quality, and the trader referred to speaks very highly of it. There is no light berry to speak of, and the bean is a fine large compact one, as good as I have seen anywhere.

"The soil on this place being excellent there is no reason why this should not be the case with succeeding crops

"Personally I think you have picked out an ideal place for a coffee estate, though a slightly heavier rainfall would be an advantage."

"With regard to next year's return there will be pickings over an area of about 200 acres calculated as fully planted up, and you ought to get at least 30 tons from it."

FINANCIAL POSITION.—From the Balance Sheet it will be apparent that the capital of the Company is exhausted.

In the meantime and pending further particulars from Nyassaland as to the probable expenditure and crop for the two following years, the directors have arranged with Messrs. Carson & Co., that the latter should lend £500 sterling to carry on with, until it is seen what further additional capital is required and can be raised, or whether a loan for the requisite amount can be arranged in London.

FINANCIAL YEAR.—It is proposed to alter this to 31st December instead of as at present. By the end of 1900 the Directors hope to be in a position to state whether the success of the Company is assured or not.

Mr. G. Kent Deaker retires by rotation, but is eligible for re-election.

The appointment of an Auditor for the ensuing year rests with the Meeting.

NOTES FROM NORTH BORNEO.

(*By a Ceylon Correspondent.*)

When I last wrote you, I was on my way to the interior, using the 20 miles of railway now open to Beaufort. This line leaves Brunei Bay at Weston—named after Mr. A J West, the Engineer in charge—a town in name only at present—situated on the Bukow River. It consists of a small number of (15) native huts and a telephone office. It is not proposed to sell any shop lots until the ground has been raised a little. At the back of

THE FUTURE TOWNSHIP,

there is a large gravel hill, excellent ballast, and this is now being used to form a mole cut into the Bukow River, which at this point more resembles an inner bay. When the mole has sufficiently advanced, say 80 yards, a pier will be run out into deep water. From Weston to Bukow, the line runs for eight for miles through level ground, well-cultivated paddy fields and fruit trees abounding. This land is very well suited for coconuts. Bukow is the present headquarters of the railway officials, but its cluster of shops will probably have to be removed to Weston or up the line when the railway works are more advanced. Beaufort at the 20th mile, is situated on the great Padas River, which will require a bridge of some length, about 500 feet.

THE RAILWAY WORKS

are progressing up the Padas Valley, but, as the rails are only laid for a mile or so, I continue my journey by boat, taking one and-a-half day to reach the foot of the Penotal Gorge. At Rayoh I met Mr. W Tower, the Railway Engineer, who is drawing up a report for an extension of our railway, and together we walked up the Gorge, taking two days inspecting the more difficult places and camping half way. At the top of the Gorge, we stayed with the District Officer, Mr. Charles Keasberry, in his comfortable new bungalow which overlooks the plains, or patanas as they are called in Ceylon. These plains contain numerous small villages, irrigated paddy fields, the water for which is sometimes brought along the contour of the land for miles, and clumps of coconut and other fruit trees. The plains are narrow—under ten miles broad—but they extend fully thirty miles and over. Tradition says a great lake existed here until the Genii of the lake lost his daughter who fell over the brim. This caused the Genii of the lake to break the brim so that he might join his daughter, which he could only do by allowing the water to convey him. This

ACCOUNTS FOR THE GAP IN THE HILLS,

through which the Padas flows in one continual roar, 13 miles down to Rayoh. The fall is about 400 feet, there are no actual waterfalls, and navigation is impossible. There is a story that 30 Dyaks descended the Gorge—that only eight lived, and their boats and all their gutta were lost.

The bridle-path through Gorge is a great boon to the natives, who formerly had to walk over Rayoh Hill 3,400 feet in elevation. Rayoh is only 150 feet and the path was so bad that no cattle could use it. Mr. Tower walked up and down the bridle path with me and he said it was quite as good a bridle path as the hill paths of Ceylon. We could not ride it; first, because we had no ponies, and second (if another reason is wanted) a small landslip and a fallen tree barred the way, but these little difficulties could be obviated by the telegraph coolies. There are tele-

phones at all the places I mentioned and we found the telegraph line and

TELEPHONES VERY USEFUL

in communicating with Labuan ; but communication with Sandakan, on the other side of the territory, has not yet been established, chiefly owing to want of battery power. This will probably soon be in order.

On our return to Beaufort, Mr. Tower proceeded to Labuan and England, taking with him the plans and sections of 90 miles of railway. I stayed at Beaufort and met

MR. H. W. BAILEY, OF YOUR ISLAND,

who had come to inspect land supposed to be suitable for gutta and rubber, and I understand that he has reported favourably on a large block of 20,000 acres on the railway line and 10,000 acres to the north of Sandakan.

THE EASTERN EXTENSION TELEGRAPH CO.

who have a principal station on Labuan Island are interested in the above lands, 20,000 acres of which were given them by the Chartered Company in return for their establishing themselves at Labuan and laying a cable to the mainland, and I hope to see the planting of rubber and gutta taken vigorously in hand. Of the suitability of British North Borneo for their cultivation, there is no doubt as gutta and rubber are exported from every port varying in value from $30 to $380 a picul, say 5½d to 5s 9d per lb. In one district, the natives cultivate a rubber creeper and tap it periodically, selling the rubber per $80 a picul.

I made enquiries from Mr. Keasberry

ABOUT LABOUR.

He is opening an experimental garden at Tenom, about 800 feet above the sea, and can get plenty of labour, men and women, and frequently has to refuse small gangs of natives from the far interior who wish to earn wages. Mr. Keasberry is of opinion that a large number of coolies, say three or four thousand, can be got from the Upper Padas. This is corroborated by the headmen with whom I spoke. The climate at Tenom is delightful, and although only 800 feet in elevation ; it is as cold at night as at 2,000 feet in Ceylon and a warm night is unknown. The rainfall is probably 70 to 80 inches, but so well divided throughout the year that the paddy fields are planted

WHENEVER THE NATIVES WANT FOOD.

This applies to the dry paddy grown on the hills as well as to the irrigated paddy on the plains. I saw some Arabian coffee plants in Mr. Keasberry's nurseries, looking very well—he is planting Arabian and Liberian and is opening a clearing at 1,500 feet for tea and cinchona. When the railway reaches thus far, it will afford a delightful change. Tenom is particularly healthy, and the plains afford

SPLENDID SHOOTING,

—deer and wild cattle. I have counted 35 sambur deer in one morning. I prefer stalking, accompanied by our follower, but a popular method is the drive which is done by the villagers and their dogs while the guns are placed at the edge of the clump of forest. This necessitates very quick sighting, but there is great pleasure in

ANTICIPATING THE OUTWARD RUSH

of the driven game.

The railway in use at present is only 20 miles long ; and, at the eighth mile, a bridge is unfinished, over the Bukow; but there is a construction engine on each side, and the (unloaded) cars can be pushed across the temporary bridge. Mr. West has

BUILT ALL HIS ROLLING-STOCK

with local timber of a remarkably good quality and is running one first-class car, a dining car, one third-class car, and as many trucks as required, twice a week from Weston to Beaufort. This interferes a good deal with the ballasting operations, but it is desirable and traffic is already leaving the river Padas for the railway. Transport is cheaper, and a very good class of shop is to be found both at Bukow and Beaufort. I noticed that the

FUEL USED IS WOOD ;

previously it was coal, which is cheap, quarried in Labuan. There are large coal seams at Bukow which were purchased from the Sultan of Brunei before this province, Province Went was taken over by the Chartered Company. These now belong to the Rajah of Sarawak, and it will be a good thing both for the Rajah and the railway when they are worked.

Arrangements are being made for the transfer of the Customs Office and Police Station, now situated at Batu Batu, which commands the entrances of the Padas and Bukow rivers, to Weston, the railway terminus. This means the migration, also of about 150 natives whose chief occupation is fishing. The fishermen will then be in touch with a large population and obtain a better sale.

FOOD SUPPLIES.

The price of fresh fish is three cents a catty. Fowls are dear and beef is rarely obtainable. Wild pigeons and other birds are snared in great quantities, and are very cheap, and vegetables, thanks to the Chinese gardens on the railway line, are plentiful. Fruit is plentiful and cheap. It is very satisfactory to note that the

CHINESE ARE PLANTING COCONUTS

in their gardens, and they are doing well. Two applications from Chinese engaged on the railway works for 20 acres and 25 acres have just been approved. The price is $3 an acre, beautiful soil and a healthy climate. Marco Polo mentioned the Chinese in Borneo (how many years ago?) and today they are becoming as numerous as they were in his time. They are kept out of the Australias and the Americas, and possibly the occupation of the Philippines by the Americans will mean restricted intercourse with China—but we have only one remark, to Chinese or to any decently behaved people—

LET THEM ALL COME !

GREY AND OTHER BLIGHTS: THEIR STUDY AND THEIR REMEDY.

(*By a Ceylon Planter.*)

In writing the following notes on grey and other blights, I must ask your many readers to excuse shortcomings and I can only hope that this article may be of interest to some.

Grey and brown blight seem to be of the same family and both live on the matter found in the leaf-cells of the hop plant. The mycelium of these pests ramify through the intercellular tissues and reproduction is carried on by spore-bearing hyphae, which may be seen on the decayed leaf surface. It is a curious fact that fungi similar to grey blight (in its effect) may be found on almost all trees, etc.—coffee, gums, jungle and so on. If such are the same as is found on tea, it shows how widespread the pest is ; otherwise it is reasonable to suppose that the present increase of blights is entirely due to

climatic reasons, and that such will decrease as rapidly as they came.

It is the general opinion among planters that—especially where the bushes are healthy and vigorous—no decrease in yield has occurred or is likely to occur; and it is easily noticeable that—though these blights increase on shuck patches—healthy tea seems to hold its own; and the disease though present seems unable to make headway.

Dr. Watt speaks of increase occurring vegetatively and the spread of disease by mycelia: this may be so, but spores carried about by the wind seem the chief means of reproduction. This is especially noticeable now when the prevailing direction of the wind is from the South-west. Slopes with that aspect are much more affected than others.

There seems to be a great diversity of opinion as to the seriousness of these pests. Some planters take a morbid pleasure in prophesying horrors, against which the coffee trouble pales into insignificance; others and, I am glad to say, the majority, take a much more favourable view of the matter, and it is significant that in the ranks of the latter may be numbered not only the majority of the ablest and leading planters, but men whose experience of coffee would tend to (were such a thing necessary) make them be among the worst alarmists. The general opinion seems to be that, while no real danger need be apprehended still precautions should be taken to prevent further increase. It is a strange fact, that, while Dr. Watt, Mr. Bamber and other scientific men should lay such stress on the necessity of prompt and drastic action, as well as talk so largely of the fearful rapidity with which such pests spread—we find Assam, for instance, has been the home of gray blight for many years and that although yields may have been reduced on shuck estates, healthy places there can even yet boast of bumper crops. As for Ceylon, an old and experienced planter remarked the other day that he recollected grey blight causing a great scare some 12 or 15 years ago, and how at the time he and others thought that tea was going the way of coffee. However, the blight decreased just as rapidly as in the first place it increased; and, though I am not sure on this point, I believe he remarked that the weather at the time was as abnormally wet as it has been during the last few months. The local "Times" of Thursday last speaks of mossing and asks whether estates on which such work is carefully carried out, show any freedom from pests. From observation I should say that they do not, and I have found blight almost as bad on one of the most carefully and systematically cultivated estates in the island as on less-cared-for neighbouring places. A planter further asks whether grey and brown blights respect jât and what jât seemed to be most affected. Personally I should say China jât seems to escape easiest, and that the better jâts suffer most: the latter seem affected most from pruning to about 18 months on, after which, the bushes being denser and the leaves harder, blight is not so noticeable.

Now for remedies: in order to do any real good some uniform system must be adopted, and an economical as well as efficient treatment has yet to be found. In this we seem to have to depend on our own resources. Science can tell us that this or that treatment will kill fungi, but is quite at a loss as far as remedies suiting the peculiarities of tea are concerned. Most estates, however, are trying something; but I doubt whether in some cases good is being done, and it is reasonable to suppose that blight is being sown broadcast by some of the supposed methods of cure which have been adopted. Among other methods the following may be worthy of trial:—

1. Collecting and burning the prunings when green.

2. Collecting and burying of all prunings with lime.

3. Picking off infected leaves from bushes and burning same.

4. As well as picking off, etc., sweeping the ground and burning the leaves so collected.

5. Pruning strips of from 20 to 40 lines leaving strips unpruned, heaping prunings in unpruned parts and firing same.

Possibly the most effective method would be a combination of Nos. 1 and 2 followed by No. 3. The great advantage of the first two methods is the value of such in cultivation. Where land is not too steep burying prunings makes a valuable bulk, and the soil being light, it is one of the only available ways of building such up and creating humus. Where land is too steep for this process, prunings could, while quite green, be collected in ravines and on roads and burnt: the resulting ash, collected and returned to the soil, is the cheapest potash manure we have—not to speak of the great value of the large amount of carbon in the ashes as a collector and retainer of ammonia. If tea so treated was afterwards gone over and blighted leaves picked off, it should not be either a difficult or expensive way of keeping blight in check.

Picking off blighted leaves has, from what I hear, not given entire satisfaction—this may in some cases be due to the pickers not being provided with proper receptacles. Personally I have provided them with thick canvas bags; notwithstanding this I find the blight increased after the first round of treatment, the second round taking twice as many coolies as the first. This might be due to climatic reasons, as I find the third round to be fairly free from infested leaves. Various methods are being tried in picking off leaves:—giving each plucker a bag and making them—while doing ordinary plucking—remove sickly leaves, is one; this may do when blighted leaves are few and far between, but personally I think a special gang doing nothing but this work is cheaper and the work done is much cleaner. It is quite possible that handling these leaves on dry hot days may scatter spores largely; but when this work is done in damp rainy weather, this should not occur. On the other hand wet weather is more favourable for the germination of the spores. No. 4 method is being employed on some estates, and no doubt is effective; but I doubt whether the good done is worth the heavy expenditure that this method of treatment entails. No. 5 method seems drastic, but I

believe has been tried in some cases. I should say that where blight is so bad as to require such treatment, the sooner such tea is pulled up and destroyed the better, as such bushes would never stand the shock of being killed back—which most of them would be—and at the best surviving bushes would be nothing but typical nurseries for parasites; and I may add that methods even more drastic than this have been tried in Assam, and in nearly every case the new bush grown has within a year been as bad with blight as ever. Blight, it seems to me, should be looked upon more as an effect than a cause. What has been the history of first coffee rather than tea? We have in most cases steadily drained the soil of its nourishing properties and, as long as dividends were forthcoming, have been content to ignore the laws of nature; with what result?—a decrease in both quantity and quality, as well as an increase in cost of production. Too late we turn our thoughts to manuring and general cultivation of the sickly and hide-bound bush we have left and by many years of ill-treatment trained into a nursery for all kinds of diseases which are afterwards distributed in the tea of more healthy and neighbouring fields. Having done all this we commence manuring and in many cases with disappointing results—why, it is not difficult to see: as with the bush so with the roots. And the latter in consequence—until new and healthy root stems are formed—are unable to utilize manures to the best advantage.

The chief thing necessary now is either the entire clearing out of tea on sickly ridges or the building-up of the same by a system of bulk manuring. In the latter case many methods might be adopted, burying of prunings, decomposed vegetable matter (cheddie could be collected into pits for this purpose) heavy dressings of castor cake and where available application of cattle manure and I believe much might be done by planting cuttings of say *Adhatoda vasica* (a highly nitrogenous plant, also making a good fungicide) amongst tea on poor soil a few months before pruning, to be afterwards buried with the prunings. In conclusion I might again repeat that the general opinion of practical men is that no real danger need be apprehended in connection with the present increase of blights; and I think we shall find these parasites will shortly play a more important part at annual company meetings than on the estates.

MINOR PRODUCTS REPORT.

Cinchona.—In addition to the quantities announced by us last week to be offered at the Amsterdam auctions on August 24th a further 2,251 bales and 93 cases (192,726 kilos) been brought forward. This now brings the total to 7,564 bales and 276 cases (688,364 kilos). The shipments from Ceylon for the week ending July 18th were 30,647 lb, and from January 1st to 18th they were:—

	1899	1898	1897	1896
Lb ...	277,336	277,755	304,311	193,398

Five brokers have declared auctions in London on August 15th the total at present amounting to 1,132 packages, of which at least 800 are East Indian bark.

Citronella Oil.—Quiet and unchanged at 11d to 11½d per lb on the spot in drums. The Ceylon exports for the week ending July 11th were 23,270 lb, of which 21,002 lb were for London.—*Chemist and Druggist*, Aug. 12.

LABOUR AND TRANSPORT IN THE PHILIPPINES.

Mr. Dean C. Worcester, Assistant Professor of Zoology at the University of Michigan, in his book "The Philippine Islands and their People,' says:—

"The labour problem is a serious one. There is little trouble in getting a limited number of fairly good workmen, but when it comes to conducting any enterprise necessitating the employment of men in large numbers, difficulty is sure to be encountered.

"Wages are low, running from four to eight dollars per month, but one is often compelled to seek labourers at a distance, and to make them heavy advances against salary account. Should they desert before working out the debt, there is, under existing conditions, no legal redress.

"It is often necessary to sub-let parts of large estates to natives who work for a percentage of the crop raised, but they improvidently spend their wages as soon as earned, or sooner, and have nothing left to live upon. It is, therefore, necessary to loan them money on security of a crop not yet harvested, perhaps, not even planted; and should it fail, one is left out of pocket. Considerable losses from this and similar causes are inevitable.

"At the best the native is an intermittent worker. He is indisposed to exert himself unnecessarily, and is apt to relapse suddenly into idleness when he has accumulated a small sum in cash. It is to his dislike for steady, systematic labour, that the failure of so many mining enterprises has been due."

Concerning transport, Mr. Worcester says:—

"The lack not only of railroads, but of roads of *any* description, has impeded communication and transportation.

"There is but one railway in the islands. It extends from Manila to Dagupan, a distance of about 120 miles. Elsewhere transportation must be by water, by carts or sledges usually drawn by buffaloes, but sometimes by bullocks, or finally by coolies. The last method is often the only practicable one.

"This lack of any adequate means of overland transportation has contributed as much as any one cause toward retarding the commercial development of the colony. There is fairly regular communication between the more important islands by means of steamship lines, but freights are high."

PRODUCE AND PLANTING.

Indian Tea Companies' Results.—Mr. Seaton's annual tabular return shows the results of the working of forty-five Indian tea companies. The paid up capital of these companies is £7,047,885. The average dividend distributed on this capital was 5⅝ per cent. which is a shade below that of the previous period. The reserves are also a little lower, being £534,000 against £559,000. These results follow naturally upon the fact that the profit per pound earned was only 1·45d representing £392,000, against 1·5d per lb. representing £413,000 in the 1897 season. The dividends distributed by these 45 companies varied considerably, and it may be interesting to shortly summarise them,

Thus, five companies distributed from 12½ to 15 per cent, seven from 10 to 11 per cent, thirteen from 5 to 8 per cent, and nine from 2 to 4½ per cent, while eleven companies paid nothing. The company which has distributed the best dividend is the Brahmaputra, whose shareholders have received 15 per cent. The Amalgamated Estates, Assam, Dooars, and Doom Dooma companies have distributed 12½ per cent., the Jorehaut 11 per cent., and the Balijan, Consolidated Tea and Lands, Jokai, Lebong, Moran, and Rajmai 10 per cent.

Tea Cultivation in South Carolina.—Periodically we hear of the success of tea cultivation in South Carolina, based upon experiments made on about 50 acres at Summerville. In his report made to the United States Secretary of Agriculture, Dr. Charles U. Shepard states that "last year 3,000 lb. of tea was sold at a profit of 25 per cent. The quality of the leaf is said to be good, and as the plants lived through last winter, the coldest ever experienced in the district, Dr. Shepard expresses the belief that the weather conditions are suitable for tea growing. It is estimated that when all the plants now growing arrive at maturity they will yield 10,000 lb. annually." This is satisfactory as far as it goes, but as these tea experiments have been conducted in South Carolina for a long time now, those who have the conduct of them are evidently proceeding cautiously, and South Carolina tea will not prove an important factor in the American tea supply just yet, notwithstanding the fact that a school has been established to educate the negro children in tea picking in order to solve the labour probem.

Fresh Fields.—Will afternoon tea become a popular institution in Abyssinia? A correspondent of the "Times" who is journeying in that land has done something towards the introduction of tea. He says in the course of one of his letters: "On one occasion the wife of one of these generals determined in her own mind that she could never allow the Ingliz to pass through without giving him a tender shake of her delicate hand, and, true to her decision, she appeared in great state before the door of my tent, and, followed by her lady-attendants, was ushered into my presence. The questions she asked disclosed an intellect of no mean order. But whilst she was listening attentively to the best replies I could give her and thoroughly enjoying the first cup of tea she had ever drunk in her life, it was suddenly announced by one of her followers that the general was coming. 'Oh! Oh!' she cried, and something else I did not understand, and, hurriedly swallowing the sweet dregs of the tea, she rushed out of the tent, mounted her mule, and swept away with her suite only just in time. When the general arrived I told him of the honour that had been paid me. He was exceedingly amused, and forthwith presented me with a magnificent riding mule, all ready saddled and bitted. I hope that he was equally considerate to his charming wife."

Detecting Adulteration.—Tea, coffee, and tobacco-growers will take some interest in the work done in the Government laboratory, in the matter of testing adulteration. Among the Parliamentary papers issued on Saturday is the report of Dr. T. E. Thorpe, F.R.S., the principal chemist of the Government laboratory, upon the work of that department for the year ended March last. Its business is mainly in connection with the Inland Revenue, of which it is practically a sub-department. Dr. Thorpe points out that the chemical and testing work in connection with samples of foreign produce is done partly at the laboratory at the Customs House and at stations at the docks and outports, and partly at the laboratory in Clement's Inn Passage, Strand. The work of the Customs House laboratory is mainly to determine the dutiable value of samples of imported wines, spirits and beers, and a great variety of other products are examined for alcohol, or for evidence that alcohol has been used in their preparation. Samples of leaf and manufactured tobacco from the factories under the supervision of the Customs are examined for the amount of moisture they contain, whilst samples of manufactured tobacco, mainly seizures, are examined for sweetening material. "Offal" tobacco is also inspected for genuineness prior to its examination for drawback value. Samples of tea, selected at the discretion of inspectors, are also sent for chemical and microscopical examination, and during the year fifty-seven samples, representing 1,616 packages, were found to contain exhausted leaves or to be mixed with other substances within the meaning of the Sale of Food and Drugs Act. These were refused admission for home consumption, or were forfeited and destroyed or otherwise disposed of as being unfit for human consumption. It may be of interest also to note that tea which cannot be admitted for use as a beverage is "denatured" by being mixed in bond with assafœtida and lime, and used for the manufacture of caffeine, coffee is examined for chicory and coffee substitutes, and several cases of adulteration were discovered, the payment of drawback on these being refused. Roasted cereals imported for used as coffee substitutes are examined for chicory, which, if found, renders them liable to duty.

Coffee Adulteration in South Africa.—Tea, for some mysterious reason, has not as yet increased its popularity in South Africa, where coffee at present holds sway. It might be thought that consequently the coffee would be pure and good, but this is far from the case. The "Cape Argus" remarks that everybody knows that his morning cup of coffee is not the product of the pure berry, and this view is corroborated by the report of the Cape Public Analyst, just published.—*H. and C. Mail*, Aug. 18th.

Tea Pests.—With reference to the Tea pest notes, given on page 271, we may say that the serial *Indian Museum Notes*, from which they are taken, are issued by the Trustees of the Indian Museum, Calcutta, under the authority of the Government of India, Revenue and Agricultural Department to take the place of *Notes on Economic Entomology*, of which two numbers have appeared. The parts of the serial are published from time to time as materials accumulate. Communications are invited by the editor, *Indian Museum Notes*, Calcutta. Correspondence connected with Economic Entomology should be accompanied by specimens of insects to which reference is made. Caterpillars, grubs, and other soft-bodied insects can be sent in strong spirit; chrysalids and cocoons alive, and packed lightly in leaves or grass; other insects, dried and pinned, or wrapped in soft paper. Live insects should be sent when there is a reasonable probability of their surviving the journey. Caterpillars, grubs and other immature insects can often be only approximately determined; they should therefore, where possible, be accompanied by specimens of the mature insects into which they transform. Insects forwarded for determination should, in all cases, be accompanied by a detailed report showing precisely in what their economic importance is believed to consist. *When* the Agricultural Department of Ceylon is established we trust we may not require the valuable assistance which is now offered by the Indian Museum authorities; meanwhile Ceylon is not too far off for considerable use to be made of it.

TO ALL PARTS OF ASIA, AFRICA, AMERICA AND OCEANIA.

Seeds & Plants of Commercial Products.

Hevea Brasiliensis (Para Rubber).—Orders being booked for the coming crop available in August and September. This is the only crop of seeds in the year. All orders should reach us before the end of July to avoid disappointment, as we have to make arrangements in time; guaranteed to arrive in good order at destination. We have already booked a large number of orders. A Sumatra Planter writes, dating 9th March, 1899 :—"I consent to the price of £——per thousand. I herewith order 50,000 upon condition that you guarantee at least 33 % seeds germinating." Plants can be forwarded all the year round in Wardian cases. Price and particulars as per our Circular No. 30.

Ficus Elastica (Assam and Java Rubber.)—Seeds supplied by the pound with instructions; price according to quantity. This tree grows equally well in high and low land, in forest and grass land, its cultivation being extended largely by the Indian Government.

Manihot Glaziovii (Ceara or Manicoba Rubber).—Fresh seeds available all the year round; price as per our Circular No. 31. It is superior to Mangabeira rubber and second to Para rubber.

Castilloa Elastica (Panama or Central American Rubber).—Seeds and Plants supplied; price and particulars as per our Circular No. 32.

Urceola Esculenta (Burma Rubber) and **Landolphia Kirkii** (Mozambique Rubber).—Seeds and plants, both are creepers.

Cinchona Seeds.—Different varieties.

Hybridised Maragogipe Coffee.—A larged-beaned superior variety of Coffee in demand; seeds.

Santalum Album (Sandlewood).—The cultivation and felling of the tree is entirely under Government monopoly in India, Sandlewoods to the value of over £100,000 being annually exported to various countries from India. The cultivation of this useful tree is now receiving increased attention in other countries; seeds and plants.

Eucalyptus Marginata (Jarra).—Large quantities of this most valuable timber are being annually exported from Australia to London and various parts of the world for street paving and other purposes. Price of seeds on application. 7,846 pieces of Jarra timber has already arrived for Ceylon use.

Seeds and Plants of Cinnamon, Nutmeg, Clove, Kolanut, Pepper, Cardamom, Vanilla. Arabian, Liberian and Maragogipe Coffee, Cacao, Tea, Coca, Fibre, Medicinal and Fruit Trees, Shade and Timber Trees, also Palms, Bulbs, Orchids, &c.

Our enlarged Descriptive Price List of Tropical Seeds and Plants of Commercial Products for Foreign Countries for 1899-1900 are now being forwarded to applicants in different parts of the world.

"South Africa."—The great authority on South African affairs of 25th March, 1899, says:—An interesting Catalogue reaches us from the East. It is issued by William Brothers, Tropical Seed Merchants, of Henaratgoda, Ceylon, and schedules all the useful and beautiful plants which will thrive in tropical and semi-tropical regions. We fancy Messrs. Williams should do good business, for now that the great Powers have grabbed all the waste places of the earth, they must turn to and prove that they were worth the grabbing. We recommend the great Powers and Concessionaries under them to go to William Brothers."

A leading Planter writes from *New Hebrides* under date 17th January, 1899 :—"I shall like a few more of your Catalogues to distribute through these Islands, as I feel sure many would place themselves in communication with you, did they know where to write for Seeds and Plants."

Our New Descriptive Price List of Seeds and Plants of Fruit Trees now being prepared and will be ready shortly.

Agents in London :—Messrs. P. W. WOOLLEY & Co., 33, Basinghall Street.

Agent in Colombo, Ceylon :—E. B. CREASY, Esq.

Telegraphic Address :

William, Veyangoda, Ceylon.

Lieber's, A.I. and A.B.C. Codes used.

J. P. WILLIAM & BROTHERS,

Tropical Seed Merchants,

Henaratgoda, Ceylon.

HANKOW, THE TEA MART OF CHINA.

(*From "The River of Tea" by E. R. Scidmore in the "Century Magazine" for August*).

Hankow, the great tea-market of China, and sit companion cities of Hanyang and Wuchang, six hundred miles up-stream from Shanghai, together present one of the greatest assemblages of population in China. Abbé Huc, who passed this way in 1845 and wrote the most interesting and still useful travelers' book about China, estimated the combined population of the three great cities at eight million, and drew amazing pictures of the crowded river life of the Han and Yangtsze, a floating population depleted by thousands in the miles of burning junks when the Taiping rebels got their first taste of blood and plunder in the destruction of the three cities. For half the year the Yangtsze runs at the foot of a forty-foot stone embankment where broad flights of steps lead up to the park, or bund, of the British concession, a model foreign settlement extending from the walls of the native city for three quarters of a mile along the river-bank. For the rest of the year the Yangtsze rises higher and higher, until it often overflows the parapet and the great esplanade, the settlement streets and the race-course being navigable by small boats for weeks at a time. Since the opening of the port in 1861 this British concession, with its smooth, clean streets shade-trees, and flower-beds, has been an object-lesson in municipal order wholly thrown away on the Chinese wallowing in the filth of the native city. Only the magnificient, red-turbaned Sikh police have really impressed the natives, and with their splendid scorn and contempt of the yellow race, these men from the Punjab have maintained order, in fact the most serious decorum, in the settlement. The Chinese have conceded land along the river-bank adjoining the British concession for a Russian settlement, and beyond that tracts for French and German settlements, which when embanked and improved, will give the great foreign city of the future a continuous bund, over three miles in length.

THE CHANGE THAT HAS TAKEN PLACE.

Hankow, so long the chief source of supply of British tea-drinkers with fifteen or twenty tea-steamers in port at a time loading for London, has undergone a change in this decade. As Chinese teas deteriorated in quality and tea-farmers became more careless and dishonest, India and Ceylon teas began to win favour, and with the enormous increase of production in those two British dependencies Chinese tea has lost its place in the British market, furnishing only one-ninth of England's import in 1896. At that same time began the general awakening of Russia. At Hankow the Russian has come, and to stay, and the shadow of the Muscovite is over it all. The Russian is not only established at the gates of China, but also at its very heart, the invasion and absorption being as remarkable in this British settlement at Hankow as everywhere in Korea and Manchuria. Hankow is fast becoming a Russian city or outpost, a foothold soon to be a stronghold in the valley of the Yangtsze, which China has given her word shall never be alienated to any power but England. Some alarmists may even view the Siberian merchants at Hankow as emissaries, like those armed Russian monks who first established themselves in the Caucasus and Asia Minor in stronghold monasteries. Although the Russians have their own concession at Hankow, they do not care to build upon it and live there, amenable then to Russian laws and consular jurisdiction, to Russian restrictions and espionage; and the consulate and a few warehouses were the only buildings on the Russian concession in 1896. The Russians prefer the laws and the order of the British concession, crowding in upon it at every opportunity, competing for any house that comes into the market, and building closely over former lawns and garden-spaces. They compete with and outbid the few British tea-merchants who remain in these days of active Russian trade aggression. Only one tea-steamer took a cargo to London in 1896; two more British firms closed out and left Hankow that year; and, still more significant, only one pony showed the colors of the one British racing-stable at the autumn races. In the retail shops prices are quoted and bills made out as often in rubles as in taels or dollars, and the Russians have gradually assumed an air of ownership, of seigniorial rights, as complete as if they held the lease or diplomatic deeds to the place for ninety-nine years.

THE ANNUAL MARKET.

This great tea-market of foreign Hankow is a city of six weeks only, the heads of the great hongs, or their managers, occupying their residences from the first of May to the middle of June each year. Leaf-teas are fired and shipped until September and even later, and brick-tea is made until January, but the choice tea is all looked to in those few weeks. For that first quality the Russians buy only the first "flush," or crop of young leaves unfolding at the tips of the new twigs of the evergreen camellia-bush each April. These pekoe and souchong "leaves of the second moon" are carefully picked by hand, while the next crop of tougher leaves is cut with a knife, and at the third and fourth gleanings the knife takes whole twigs, woody stems as well as leaves. The first crop of pale, downy leaflets is cured, or put through the wilting, rolling, fermenting and drying processes, at the tea-farm, the fermentation changing the colour of the leaf to a reddish brown, and converting part of the tannic acid to sugar, in which regard black teas differ from green teas, the leaves of which are dried as they come from the bush. With all the machines invented and used on tea-plantations in India and Ceylon, a drier has only once been used in China. All attempts toward greater care and cleanliness in preparation have been as vain as attempts toward introducing machinery at the tea-farms themselves. Not declining trade or prices—for the tea trade is not nearly what it was eight years ago—can stimulate the tea-growers to any change, and only when the whole country is open to foreign trade and residence will each village or valley have its own tea factory to cure and pack the tea for final shipment on the spot.

THE COMMENCEMENT IN MAY.

The dried tea leaves of the first crop are gathered up by middlemen and brought to Hankow, and on some day in the first week of May the Chinese brokers, in silk array, are borne in sedan-chairs from the native city and set down in the compounds of the great hongs to offer their first *musters*, or samples of tea. The high season begins at that moment, and for six weeks, in the first scorch and stew of its summer climate, Hankow runs at high pressure. The musters are tested by foreign ex-

perts, the skilled tea-tasters, whose acute and highly trained senses render their judgment and appraisal unerring. A few leaves are carefully weighed from the muster into a shallow cup, and boiling water poured over them. The tea-taster notes carefully how the leaves unfold in the water, how the liquor colours and deepens to a rich, clear coffee-brown, and inhales the fragrance of the essential oil as it is borne off in vapor before he takes his judicial sip. He carefully analyzes its qualities for the second it rests on his tongue, and then ejects the liquid, never by any chance swallowing it. A price is agreed upon, and the tea is brought in chests and thick paper sacks and dumped into great bins at the factory, where it is refired, or toasted slowly in iron pans over charcoal fires, to dry it thoroughly, then sealed in air-tight lead cases within wooden chests, which are papered, varnished, covered with matting, and hurried abroad the waiting ships. The average price at Hankow for the first quality black leaf-tea, which is all shipped to Odessa, is about 40 Mexican dollars for each ninety-pound chest. Twenty-five half-chests of this first crop's pekoe leaves are sent to the Emperor of Russia for palace use. Several times it has happened that the whole crop of some particular farm or hillside has been brought up by the Russians and shipped before Chinese connoisseurs, who would drink no other tea, knew it. At once they cabled to Odessa and had the tea bought on arrival and shipped back to China. Twice on the Yangtsze I used a rich and fragrant tea from the Keemug hills that had performed that journey to Odessa and return, because some mandarin knew what he wanted and was willing to pay for it.

THE TEA-TASTER.

The tea-taster is king at Hankow for the six weeks of his exclusive reign, and whatever he may do during the remainder of the year, he is a most rigid total abstainer during the high season, when every faculty of his keenest senses is on the alert. Although he never swallows a sample sip, the tea-taster's nerves and digestion are impaired at the end of ten or twelve years, even the stimulating effect of the strong, volatile aroma in the tea-hongs sometimes giving retired tea-tasters attacks of that tea-tremens which the Chinese and Japanese recognize as a disease; while temperance reformers, usually green-tea drinkers, seem ignorant of the fact that other stimulants than alcohol may be abused. The professional tea-taster at Hankow is said to drink only soda or mineral waters during the scorching weeks of his exacting season, and when word goes round the settlement that such a one of the great experts was seen to take sherry and bitters at the club, it is a signal that the great tea season is declining, that little choice tea is being brought in. Then the tension relaxes, and a certain section of Hankow gives itself over to a jubilation and indulgence that are the scandal and byword of the other ports. Although the tea firms are all Russians or Siberians now, the tea-tasters are Englishmen, and, for reasons not flattering to Russian character, it is said that the tea-tasters will always be English. No green or oolong teas, no perfumed or fancy teas, are included in these great summer shipments, those being specialties of the southern ports. Several times I was regaled on Pu'erh-cha, the greatly esteemed "strengthening tea" from Pu'erh Fu in Yunnan. It had a mildewed, tobacco, weedy flavor, a bitter draught which is warranted to strengthen the system, clear the brain, relieve the body of all humors and bile, and serves high-living mandarins as a course at Hamburg does European bon-vivants. This plant grows in the Shan States, and the leaves are brought to Pu'erh Fu to be steamed and pressed into large, flat cakes, which, being packed in paper only, soon mildew. The long, viscous leaves are probably from some variety of the wild Assam tea-plant, and the taste of the dried leaves themselves is a little like the *yerba buena* of the California foot-hills. The Chinese consider the Pu'erh-cha the better by age, and do not heed the mildew flavor. It promotes longevity along with its therapeutic qualities, and is sent regularly to the emperor at Peking. Despite the distinguished consideration implied, I should not care to have the costly herb offered me again, and, with all the craze for cures, I doubt if Pu'erh-cha would ever find favor abroad.

RUSSIAN CUSTOMERS.

The Russians buy the best and the worst, the dearest and the cheepest teas in Hankow's market, the chests of choice tea going to Odessa for European Russia, and the compressed brick-or tile-tea to Mongolia and Siberia. By September the best leaf-teas are fired, and some tea-steamers are back at Hankow for second cargoes, Odessa ships trying to make two round trips in each season. After that the tea-farmers send in the bags of coarse leaves, broken and refuse tea, the dust from their tables, bins and floors; the factories have binfuls of such leavings and sweepings too, and the manufacture of brick-tea begins, and continues until January before all such accumulations are disposed of. Tokmakoff, Molotkoff & Co.'s brick-tea factory, which is managed by a Scotchman, who invented and adapted several of the machines and processes employed, is the largest factory in Hankow, employing fourteen hundred workmen through the long season, and shipping nearly a million bricks a year, with an almost equal output from their factory at Kewkiang. All the way to their compound the settlement is fragrant with toasting tea-leaves, delightful whiffs coming from the rows of windows at that end of Hankow, where walls are higher and longer, and chimneys rise significantly. They showed us first the bins of fine dust, ground and sifted by wretched, sallow, greenish-hued coolies, whose nostrils were filled with cotton-wool to prevent their breathing in the insidious dust. Two pounds of tea-dust are weighed into a cloth, which is laid on a perforated plate over a caldron of boiling water and covered for a few minutes, when it is poured into a clumsy wooden mold, and a half-pound of finer dust added as a surface. The mold is covered, put under a screw-press, and clamped shut. The noise around this press is deafening as the heavy molds are clanged about on iron tables and the stone floor, and with the half-clothed workmen moving in clouds of steam from the caldron and shouting their hideous dialect about the dark warehouse, a short inspection of the process satisfies. The bricks remain in the molds for six hours to cool, and are then removed, weighed, and stacked in endless rows in an upper story to dry and shrink, before being wrapped in paper, furnished with red lables in Russian, and packed in baskets holding seventy bricks each. All defective or under-weight bricks are broken and ground to dust again, and it takes heavy blows with an iron, or sharp raps against the stone floor, to break one of these inch-thick black tiles, which are nine inches wide and

twelve inches long. A larger and a smaller size of green-tea bricks are also made at this factory, into which the coarse leaves and stems go entire, without grinding. One naturally wonders that machinery is not employed for all these simple processes, and that some Yankee does not start a factory where a stream of tea-dust would go in at one end and rows of bricks come out at the other ; but human lifeis so over-abundant in China that hand-labor is cheaper than any steam-driven machinery coolies' food worth less than engine coal.

BLACK BRICK TEA.

The black brick-tea for Mongolia and Siberia, and in fact almost the whole tea-supply of Russia, used, long ago, to go from Hankow by boat for three hundred miles up the Han River, was portaged across, and taken a distance up the Yellow River, and then loaded on camels and carried across Shansi to Kiakhta, on the Siberian frontier. The caravan trade from Kiakhta and Kalgan to the Volga was the subject of negotiations by the embassy Peter the Great sent to the Emperor Kanghsi, and ever since there have continued, winter and summer alike, the unending processions of camel trains back and forth across Siberia. Nijni-Novgorod was then the tea-market of Russia, and the water and land transportation across Siberia was so cheap that tea could be delivered in Nijni-Novgorod by caravan more cheaply than by tea-steamers to European ports. The opening of the Suez Canal gradually moved the tea trade to Odessa ; the tea brick is no longer a unit of exchange at Nijni, and the great fair on the Volga has lost its most picturesque feature with the vanishing of the camels and the great tea-caravans. When all the Russian tea came by caravan to Nijni, " caravan tea " had a deserved repute in Europe. About the time that the Russian tea trade shifted to Odessa, the name of " caravan tea " reached America, and dealers, not always informed themselves, played with the catching word. One is offered " Russian tea," and assured that " caravan tea " is better than other teas, because a sea voyage spoils the flavor of tea. One must not inquire how the tea crossed the Atlantic, evidently. If all leaf-teas were not sealed in air-tight lead cases, the sea air and ships'-hold odors could not taint them as unspeakably as the proximity of camel's wool, pack-saddle coverings, and the belongings of the filthy Mongol caravan-men on their three months' journey across Siberia.

A FEW FIGURES.

Hankow's trade statistics deal in large figures for the export of tea. In 1896 there went out from that port 470,063 piculs, or something over sixty million pounds, of leaf-tea, and 434,107 piculs of brick-tea ; yet the tea trade has fallen off, and the figures are not so large as when the English were the great consumers.

CEYLON EBONY.

DIOSPYROS EBENUM—*Koenig.*

(From the *Indian Forester for August.*)

The name Ceylon Ebony for *D. Ebenum* is not absolutely correct, for this species is found in Southern India, nor is it only Ceylon *Diospyros* which has a black heart-wood there being others such as *D. ovalifolia*, *D. crumenata*, *D. Melanoxylon* and *D. oocarpa* which furnish a certain amount of ebony. It is even not certain whether the species will not have to be subdivided into two on account of the varied arrangement of the fruit, whether solitary or in clusters in the axils of the leaves. It is however convenient for me to use this name as it is used in the timber trade, and also because my acquaintance with it is limited to Ceylon.

HABIT.—Without going into botanical details it may be said that this is a large evergreen tree, attaining a girth of up to 14 feet. It has a roughish bark of a dark colour which, in exposed situations, has a greyish tinge. The leaves are also dark and appear as if sprinkled over with fine charcoal dust. Several other species of *Diospyros* possess very similar characteristics and it requires a certain amount of experience to distinguish the species, especially saplings and young trees.

DISTRIBUTION.—Ebony has almost the same range of distribution as satinwood as the annexed sketch map will show, but it is found more abundantly in the intermediate zone and in the south of the island it penetrates even into the moist zone. But it is most abundant in the dry zone and the richer forests are all in the Northern half of the island, especially in the Eastern portion of the North-Central Province. It is also well represented in the Northern and North-Western Provinces.

SOIL.—The best ebony is found on rocky well-drained soil. It is at times found on soil containing a larger proportion of clay than satinwood can endure but, generally speaking, it is found like satinwood on sandy loam with a good subsoil drainage. It is frequently found near watercourses, which are dry during a part of the year, but in swampy soil never. It differs in this respect from *Diospyros Embryopteris* which is frequently found near rivers, pools or tanks.

COMPANION SPECIES.—As I have stated before, satinwood is frequently a companion of ebony, as also *Mimusops hexandra*, *Nephelium longana*, *Gleniea zeylanica*, *Diospyros ovalifolia*, *D. crumenata*, *D. oocarpa*, *D. montana*, *Vitex altissima*, *Albizzia odoratissima*, *Berrya Ammonilla* on the moister soils, and many others. I have never seen ebony growing pure and the proportion of this species to the many others is always small. In the richer forests there may be 10 to 15 trees per acre or, taking the saplings into account, perhaps 50 trees, but this percentage is high. I have only heard of one instance, in the Mannar District, where there were 40 trees (exclusive of saplings) per acre. In an enumeration survey made recently over 50 acres in a fairly rich ebony forest in the North-Western Province, 26 trees over 6 feet in girth, 65 from 4 feet 6 inches to 6 feet and 120 trees between 3 feet and 4 feet 6 inches were counted. This gives a total of 4 trees over 3 feet in girth per acre. In average ebony forest, enumeration surveys both linear and by sample area made in the Northern, Eastern and North-Western Provinces, have shown that there are generally not more than 3 to 4 trees over 9 inches in girth per acre. This is, no doubt, partly due to the extensive and wasteful fellings which were carried on for many years over the Ceylon forests, and partly to the absence of improvement fellings required for furthering the growth of the young trees and saplings.

SYLVICULTURAL REQUIREMENTS.—Unlike satinwood, ebony does not require much light for its

seedlings. As a rule, it will suffice to cut the underwood and to girdle here and there a low-crowned tree. But after the seedlings have established themselves it is necessary to remove the cover which is directly overhead, not more. When the trees reach their maximum height, it is time to give more room to their crowns, but until then it is best not to let in too much light. It is difficult to see how the seed gets distributed over the soil of the forest, except in hilly ground, where it rolls down the slopes, or near streams or foot paths acting as such during wet weather, and yet trees are found, as often as not, at the top of a slope although the seed is neither light nor apparently palatable to birds or mammals although it becomes a prey to weevils, which would be rather a factor in the destruction than in the distribution of the seed. The seed usually ripens before the North-Eastern monsoon, but the good seed-years are not regular nor is the seeding equally good all over the forests at the same time. Observations taken in the forests since 1890 have not recorded a single universally good year, but the years 1891 and 1896 appear to have been the best while in 1892-93 and 1897 the seeding was fair. The good seed-years do not appear to come in any regular rotation but are dependent chiefly on rainfall at the right time. Occasionally, ebony seeds twice in the year. (*Ceylon Forester*).

Rate of Growth.—There are, unfortunately, not yet sufficiently reliable data to show the rate at which this tree grows. Several sample plots have been started but they contain so few trees, sometimes not even all girth-classes being represented, that it is not possible to take the measurements as absolutely reliable. As a rule, after passing 3 feet in girth, ebony is very slow growing, more so than satinwood. From the data which I have been able to collect the rate of growth in the forest appears to be about the following, but, as I say, the figures are very liable to correction. The present measurements see to show that a tree reaches a girth of 18 inches at the age of 25 years, 36 inches at 75 years, 54 inches at 135 years and 6 feet in girth at the age of 200 years. On deep soil these figures are probably below the mark and the trees grow faster.

The Timber.—The proportion of heart-wood to sap-wood varies a good deal. It is commonly considered that timber grown on deep soil contains a smaller proportion of heart-wood than trees growing on rocky slopes. My own experience coincide with this theory, not only as regards *D. Ebenum* but also as regards *D. Melanoxylon*. As regards the latter, I remember that small trees on the stony slopes of the Ganges division gave a far larger supply of blackwood than comparatively large trees growing on alluvial soil in the western part of the Sharanpur division. Recently, 15 trees of Ceylon ebony, varying in girth from 6 feet to 12 feet were measured carefully. The gross volume of these trees amounted to 1,208 cft. while the volume of Blackwood was 282 cft. or less than one quarter of the volume, the proportion of heart-wood in the individual logs varying from 0·14 to 0·35. This was in good soil and measurements have yet to be made to find out the proportion of blackwood on rocky soil. As a rule, I do not think that the thickness of the sap-wood cylinder is much less than 3 inches. The largest log of ebony, which I have seen, measured 7 feet in girth after the sap-wood had been removed. Together with the sap-wood it must have been very large; for, of the 12 feet logs mentioned above, one gave a measurement of blackwood of 5 feet 3 inch while another measured only 4 feet in girth after peeling. The sap-wood is very light coloured and soft. It is peeled off by means of heavy felling axes. Circular incisions are made round the log at distances of about 2 feet apart and the portions between trimmed off. It is possible to get the wood naturally peeled by leaving the logs in the forest for some years, but timber merchants do not like these logs and consider them to be dead wood. They, therefore, fetch lower prices. The hart-wood is not necessarily black throughout. On the contrary, streaks of white or pale brown colour are not infrequent. Some forests of the island produce blacker wood than others. For example, ebony from the western side of the island is usually less streaky than that found on the east. Generally speaking, the market favours the black ebony, if it is of as good dimensions as the streaky logs, the China market especially requires the wood quite black. For cabinet work, however, especially for ornamental beading and framing, the streaky wood is in request as it is used as a substitute for calamander. As regards the comparative value of the different ebonies in India and Ceylon, it is somewhat difficult to make a comparison. *D. Ebenum* usually gives logs of larger dimensions and is on that account more valuable. In the local market, Indian ebony does not fetch as high a price as Ceylon ebony. Some years ago a local merchant imported a parcel of logs from India. The logs were of fair girth and very black, and yet they only fetched poor prices. The explanation given was, that Ceylon ebony takes a much better polish than that from India. I was not able to ascertain whether the logs referred to were *D. Melanoxylon*. If so, they were remarkably fine. Of the different ebonies which I am acquainted with, *D. Ebenum* seems to be the most close-grained. Its surface, when polished, feels more greasy to the touch than others and this, no doubt, accounts for the higher degree of polish which it can take. The weight, according to Gamble, varies from 61 to 81 lb. per cubic foot. I have weighted carefully six well air dried specimens from different parts of the island and found their weights to have varied from 90 lb. to 77·7 lb. per cft. the average being 73·9 lb. per cft.

Market.—The prices realized for ebony in Ceylon range up usually to R180 or R185 per ton (weighed) for good lots. I have once known the price to go up to R210 per ton, but it rarely exceeds R185, and I have never known the price of first-class ebony go below R150 to R160 per ton. The price not only depends on the state of the market in Europe and China but on freight available. If freight is scarce or high the price naturally goes down. I may add that it is by no means an easy matter to obtain freight for timber, especially when large consignments of tea are being sent home.

It may be of interest to Indian readers to know how the sales are conducted. All ebony, excepting branch-wood, top pieces and dead wood remaining from former fellings which are sold in the forest or at minor depôts, sent is to Colombo, where it is sorted at the Central Timber Depôt in lots, as homogeneous as possible,

THE SETTLEMENT OF THE DRAFT DISPUTE.

The following petition has been addressed to the Board of H. M. Customs by the Secretaries of the Indian Tea Association (London), the Ceylon Association in London, and the Tea Buyers' Association :—

Ceylon Association in London, 61 and 62, Gracechurch Street, August 4, 1899.

To the Hon. Board of Her Majesty's Board of Customs :—

Gentlemen,—We, the undersigned, representing the importers of Indian and Ceylon tea, and also the tea huyers of the City of London, ask your kind and favourable consideration of the following petition : –

You are doubtless aware of a dispute between importers and buyers of tea at present unhappily existing the Port of London.

The importers having given notice of the withdrawal of the usual pound draft, and the trade having refused to buy their tea without the allowance, representatives from both sides have met and have arrived at a settlement, which, if it be accepted by your honourable board will terminate the dispute.

The settlement agreed upon consists in a modification of the system of weighment of tares.

We do not petition for any alteration in Her Majesty's Customs present method of gross-weighing packages of tea on arrival, but we do petition for an alteration in the method of taring packages with the exception of boxes weighing 28 lb gross or under.

We petition your honourable board to take the tare with a half-pound weight in the scale, giving buyer the tare as heretofore, on the half-pound or any fraction between that and the pound above, and per contra, if the scale does not lift on the weight side, showing that there are only, say, from one to seven and three-quarter ounces over the pound, we petition your board to take the tare at the lower pound weight.

Thus :—

26 lb. and up to 26 lb. 7¾ oz. to be called tare 26 lb.
26 lb. 8 oz. and up to 27 lb. to be called tare 27 lb.

Under your honourable board's orders, parcels of tea are allowed to be tared on an average tare if the parcel does not vary more than 2 lb. in weight.

In order that these average tares may be arrived at with greater precision, we petition that your honourable board will order the number of packages to be taken for ascertaining the average tare in various parcels to be raised, and that the packages be selected fairly by your officer and not by the warehouse foreman.

Present arrangements :—

From 1 to 10 packages	1 tarer
From 11 to 40 packages	3 tarers
From 41 to 120 packages	5 tarers
From 121 packages up	7 tarers

We propose the following alterations :—

Up to 20 packages	3 tarers
From 21 to 60 packages	5 tarers
From 61 to 120 packages	7 tarers
From 121 packages up	9 tarers

To arrive at the average tare we suggest the following method of dealing with the fractions of a pound, viz. :—

lb		lb	
22		23	
23		23	
24	117 divided by	24	118 divided by
24	5 equals	24	5 equals
24	23 2-5.	24	23 3-5.
—	Tare 23.	—	Tare 24.
117		118	

We also petition that your honourable board will order each package in every parcel of tea bulked in London to be tared separately, and that you will instruct your officers to see that the entire bulk of tea, as landed including overweight, is replaced in the packages.

The reason we accept boxes of 28 lb. gross and under is that there is no trade draft on them, and it is likely that they would be made habitually to tare below the half-pound, and the buyer would in such case not get full weight.

If, on consideration, your hon. board can see their way to accede to our petition we shall be glad if you will issue an order to that effects, as dated from October 2, 1899.

Awaiting the reply of your hon. board, We remain, gentlemen, yours faithfully,

Indian Tea Association (London).
(Signed) Ernest Tye, Secretary.
Ceylon, Association in London,
(Signed) Wm. Martin Leake, Secretary.
Tea Buyers' Association, (Signed) A. Jackson, Hon. Secretary.

The following reply has been received by the Secretaries of the Associations :

Custom House, London, August 14.

Gentlemen,—The Commissioners of Customs direct me to acknowledge receipt of your letter of the 4th instant, and to express their hearty satisfaction at the prospect you hold out of a termination of the dispute between the importers and buyers of tea in London through the adoption of special arrangments for taring on the part of this department.

1. The proposal to tare to the half-pound (instead of the pound as heretofore), rounding up if the fraction be an exact half pound or over, and rounding down if the fraction be less than half a pound, will be gladly accepted by the Board of Customs, subject to the concurrence of the Treasury.

2. As regards the method of striking the average tare, the Board see no objection to your proposal that a larger proportion of packages be selected for taring, viz :

3 out of 20 or less.
5 out of from 21 to 60.
7 out of from 61 to 120.
9 out of 121 or more.

The method of calculating the average seems to be practically that now in force.

The selection of the packages will rest on the responsibility of Customs officers, as at present.

3. Your request that each package in every parcel of tea bulked in London should be tared separately, instead of leaving separate taring to be optional, as prescribed by general order 102/1894, does not seem to command the support of all the importers, as you will see from the enclosed copy of a letter, dated the 9th inst., from Messrs. Hadden and Co., and the Board suggest that you should give it further consideration before pressing it.

4. Your concluding proposal is that the officers of this department should insist on the entire bulk of tea as landed, including overweight, being replaced in the packages, instead of allowing the use of "overtakers," as at present. The Board regret to say that they would not be justified in imposing on their officers so heavy and novel a responsibility as would be involved in the suggested arrangement. Customs officers are answerable for the security of the revenue derivable from goods in a bonded warehouse, but not for the custody of the goods themselves, and could not keep guard over every package of tea, after taring, until it had been nailed down.

If importers and buyers are agreed upon a certain way of treating overweight, after bulking, they should adopt their own precautions for ensuring that this method is duly carried out.—I am, gentlemen, your obedient servant,

(Signed) John Courroux.

The Indian, Ceylon, and Tea Buyers' Associations in London, 61 and 62, Gracechurch Street, E.C.

The letter from Messrs. Hadden & Co., referred to in the foregoing reply, is as follows :—

25, Fenchurch Street, London, E.C. Aug. 9, 1899.

The Hon. the Commissioners of Her Majesty's Board of Customs.

Hon. Sirs,—General Order, 102/1894.

As importers of Ceylon tea, ourselves benefited, and acting for others benefited by the above Order, we humbly pray that there be no alteration with regard to it.

We are led to this petition hearing today that there has been a petition, dated 4th inst., sent to your Honourable Board, requesting that the order may be cancelled, which petition has been signed by the Secretary of the Ceylon Association in London jointly with the Secretary of the Indian Association, and we are convinced that the petition has been signed without proper thought.

The members of our firm belong to the Ceylon Association—have belonged to it from its commencement—and in it there is a special Tea and Produce Committee (of which they are also members), for the purpose of considering such questions as these. The matter has not been directly brought before this Association or its Committee. Had it been brought before them we are sure the request to have separate tares taken of London bulked teas would never have been made.

Under your general order of December 22nd 1894, a practice has sprung up in Ceylon of packing teas on the day they are made, and leaving any bulking that may be required to be done in the warehouse here. If such teas are separately tared, the warehouse charges will be increased some ten per cent. and the proprietors of the tea plantations will suffer accordingly. Probably they will have to abandon their present practice and, as many of them will consider, to the injury of their tea, and do all the bulking on the estates, and this will require enlargement of factories. It is a serious question to some planters.

If you cannot refuse that portion of the petition that refers to the separate taring of London bulked teas, we humbly beg that you will postpone your assent to it for some months. Apparently all those connected with the little-considered petition to you of August 4th are now out of town holiday-making. Your very obedient servants, (Signed) James A. Hadden & Co.
—*H. & C. Mail*, August 18th.

THE CHINA TEA-TRADE.

AT KIUKIANG.

The British Consul at Kiukiang reports that tea shows an improvement as against previous years' statistics, but that the total falls short of what it used to be in former years, and British merchants are not sanguine as to the future. The season, it is said, was a specially good one for native dealers, but foreigners also appear to have done a profitable business. Ningchows, until of late years, were the favourite Russian teas. Recently, however, Keemuns seem to compete with them for Russian favour, especially in the finest grades, and this, combined with low exchange, has consequently driven prices up. If it be the case that this is caused by the Russian taste following the British and preferring stronger liquory teas, and that this is leading them to take more and more British-grown tea each year, there is very good hope for Ceylon and Indian teas in Russia. Mr. Consul Brady quotes the remarks of a gentleman, well conversant with the tea trade, who appears to be very despondent as far as regards the prospects of exports to Great Britain. He says, "Teas from the Keemun and Ningchow districts have been of superior quality, and have sold at good prices. The total yield for the season was about the same as last year, and it looks as if Russian requirements would prevent any further falling-off in production. Export to the United Kingdom, however, is steadily shrinking and threatens to become nominal. The taste of the British public in the matter of tea has undergone a marked change of late years, and consumers have no appreciation of light flavoury teas such as China produces. The introduction of machinery might revive the trade with England, and the colonies; but this seems as far-off as ever, the Chinese being quite satisfied with the prices paid for their tea prepared according to their own methods." It is added that green teas pass through Kiukiang, but no business has taken place for twenty-five or thirty years.

AT CANTON.

The British Consul at Canton reports that the decaying tea trade has again dismissed by over 500,000 lb. A dry spring and an insurrection in June in close proximity to the tea districts may, to some extent, have effected the trade, but the real reason for the decline is the steady falling off in the demand for Canton scented capers on the London Market. What demand there is more and more for low-priced teas for blending purposes, and a few more years will probably see even this small demand disappear. The quality of the teas was fully up to the average standard, and they were exceptionally well-scented. Taken as a whole the year was a fairly profitable one, both to the foreign merchants and to the native dealers. Long leaf scented Orange Pekoe and Canton Congous seem to be going entirely out of consumption. The total export of tea for 1898 was 4,163,000 lb., of which nearly three-quarters was sent by junk to Hong-Kong and does not appear in the tables at the end of this report, which are compiled from the Imperial Maritime Customs Returns.

COCONUT GROWING IN THE PHILIPPINES.

It is stated that the coconut palm will grow anywhere along the sea coast of the Philipines and flourish even in the poorest soil. Under present conditions it is ascerted that there is lots of money in raising coconuts and it is prophesied that numerous new coconut groves will be planted. The Spanish method of managing a coconut plantation is described as being very simple. The trees are set out about eight feet apart and until they begin to bear which is at the end of the eighth year the ground may be utilised for other crops the same as young orchards are at home.

After the grove comes into bearing, the owner has a steady income for life. Spanish proprietors, it is said, usually lease their groves to native tenants, who pay for each tree an annual rental one dollar mex. At this rate an acre would bring in from $200 to $300 mex a year without any effort of collecting the rent. The owner of a bearing grove of 200 acres can afford to take life very easy, and as the prolific coconut tree, produces from fifty to 200 nuts a year the tenants also have a pretty good thing of it.

A trio of clerks in the "palace" are said by their fellows to be "nutty" on the subject just now. However, this may be they are "reading" on coconut palms and planning to become rich, poco tempo, by investing jointly in a plantation.—*The Manila American*, Aug. 24.

MATE: PARAGUAYAN TEA.

Yerba mate, or Paraguay tea, is a popular beverage in South America that has been used for centuries. In 1898 the exports of this leaf from Montevideo, Buenos Ayres, and Valparaiso were over 50,000,000 pounds.

For a long time Paraguay enjoyed the reputation of producing the largest quantity and the best quality of mate, but it is surpassed to-day by Brazil. The State of Parana alone exports annually 22,000,000 kilograms (48,501,200 pounds).

The cultivation of this shrub has assumed such proportions that in the interior of the country there are whole forests of mate. Mr. Barbier, who was sent by the French Government on a scientific mission to South America, estimates that more than 11,000,000 people use mate.

In a volume published in Paris in 1716 occurs the following description:

"During the day, they make much use of the herb of Paraguay, which some call St. Bartholomew's herb, who, they pretend, came into that Province, where he made it wholesome and beneficial, whereas, before it was venomous. Being only brought dry, and almost in powder, I cannot describe it. Instead of drinking the tincture, or infusion, apart, as we drink tea, they put the herb into a cup or bowl, made of a calabash or gourd, tipped with silver, which they call mate; they add sugar, and pour on it the hot water, which they drink immediately, without giving it time to infuse, because it turns as black as ink To avoid drinking the herb, which swims at the top, they make use of a silver pipe, at the end whereof is a bowl, full of little holes, so that the liquor sucked in at the other end is clear from the herb. They drink round from the same pipe, pouring hot water on the herb as it is drank off. Instead of a pipe, which they call *bombilla*; some part the herb with a silver separation, called *apartador*, full of little holes."

The Minister from Brazil to the United States Senhor Joaquin Francisco de Assis (Brazil) prepared an article for the Bureau of American Republics, describing yerba mate, which comes to the market in the form of broken leaves, coarse powder, or in stalks, and is prepared by infusion in boiling water, like tea. It is taken with or without sugar, according to individual taste. Mate is also prepared in a small vessel called *cuia*, from which the tea is sucked by means of a tube which terminates in a hollow perforated sphere called a *bomba*.

Doctor Peckholt, of Rio de Janeiro, makes the following comparative analysis of green tea, black tea, coffee and mate:

[In 1,000 parts.]

	Green tea.	Black tea.	Coffee.	Mate.
Essential oil	7.90	6.00	0.41	0.01
Chlorophyl	22.20	18.14	13.66	62.00
Resin	22.20	36.40	13.66	20.69
Tannin	178.00	128.80	16.39	12.28
Caffeine or theine	4.50	4.30	2.66	2.50
Extract matter, etc.	469.00	390.00	270.67	238.83
Fibres and cellulose	175.80	283.20	174.83	180.00
Ashes	85.60	54.40	25.61	38.11

From this analysis, Doctor Caminhoa, professor of the faculty of medicine of Rio de Janeiro, draws the following conclusions;

First—Mate contains less essential oil, is less stimulating than coffee, black or green tea, and is, therefore, a beverage especially suited to nervous people, women, and children.

Second—Mate contains more resin than coffee, less than green tea, and very much less than black tea; it is, therefore, more diuretic than coffee, and as a stimulant rivals green tea.

The opinion of Doctor Caminhoa has been confirmed by other scientific men, among whom may be cited Doctor Lancaster, superintendent of the department of animal and food products of the South Kensington Museum; Doctor Schnepp, assistant inspector of the Bonnes waters, and Doctor Conty, the French savant, besides many others who have used and analysed the product.

Mate is prepared by infusion or decoction. Ordinarily one uses 25 grams of Mate to 1 liter of water, but this, of course, is regulated according to the individual taste. It is allowed to steep ten to fifteen minutes, and after being strained is served. It is sweetened to taste, and a little milk or rum is sometimes added. The use of utensils of iron should be avoided, as they give a dark color to the beverage.

On account of its peculiar taste, mate is frequently not liked at first. It acts as a powerful tonic, especially for invalids and those who are given to excessive physical or intellectual labors, and for all those who endeavour to solve the problem of excellent nourishment at a small expense. The journal *La France* declares that it was mate that enabled Doctor Tanner to endure forty days of fasting.

Mate is a quencher of thirst *par excellence* and a great restorative. It is a beverage specially adapted to men of studious habits to whom the use of coffee is harmful, as it gives the same results without unduly exciting the nervous system. It may be drunk cold, but it is generally served hot, and lovers of mate, absorb it by means of a *bombilla*, which is a diminutive *bomba*.

In Brazil the collection of mate is begun in December and continues until August. A company of gatherers set out, taking with them such provisions, tools, and cattle as are required for the expedition. On arriving at a suitable locality, they establish a camp or ranch, and immediately begin to gather mate, which is dried and packed on the grounds. The process is as follows: The leafy branches of the mate are cut down and placed in a pit about 6 feet square, where they undergo a roasting from a bright fire. This operation demands much care, since it is upon this process that the aroma of the mate depends, and the required amount of heat is only learned by long experience. After two or three days of drying, the leaves are reduced to coarse powder, and are packed in *serons* or bags made of raw hides, which are then exposed to the sun.*

The quality of the mate varies according to its origin and the method of preparation. That which is gathered from regions along the coast is the poorest, being less rich in gum and resin and having less aroma than that from the interior of Parana Paraguay. Leaves a year old have few of the properties required, while those of four or five years, being darker in color, thicker, and having a larger number of glands, give the best mate.—*American Grocer.*

Tea in India.—Unless manuring is taken in hand energetically, the shutting up of the larger portion of the Surma Valley plantations is merely a question of time—says *The Indian Planters' Gazette.* We have heard even old planters, employed on these places, congratulate themselves upon being able to get a thirty-mile nerrick done on such lands, not reflecting upon the unprofitableness of constantly turning up simple sand that results in a poor sixpenny average tea. It is not going too far to say that all north of the Puttareah range, and as high up as the meridian of the Goomrah in north-west Cachar, there is not one concern that can be classed as a first-rate garden. They may be kept going, but only by the adoption of the means we have pointed out. We are fully aware that there are in the area indicated isolated patches of good productive land, but these bear but a very small proportion to the rest of the property, as is proved by the averages obtained for the factories' outturn. Were it feasible to keep the produce of these plots separate from the rest of the outturn, things might improve, but unfortunately in bulking the whole gets mixed together, hence the stronger leaf is pulled down by the more insipid and weak. Manuring would go a great way to ensure uniformity; the want which in our Indian teas forms the chief complaint of dealers, and we must admit this complaint is justifiable.

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* This was the primitive method of preparing mate. To-day, however, perfected machinery does the same work better and more rapidly in large central mills, whither the product of an entire district is taken.

TEA PESTS.

BEING EXTRACTS FROM NOTES ON INSECT-PESTS FROM THE ENTOMOLOGICAL SECTION, INDIAN MUSEUM:

(By E Barlow, Assistant in charge of Entomology.)

1. EUPROCTIS LATIFASCIA, WALKER.

(sub-ord. Heterocera, Fam. Lymantriidæ.)

In March 1897, from Messrs. Andrew Yule & Co., were received some living specimens of a caterpillar which had been doing a great deal of damage to tea plants in the Darjeeling district. The caterpillars were said to be in millions and to be quite stripping the bushes of their old leaves.

The caterpillars forwarded were evidently full-grown specimens, as immediately on their arrival in the Museum, when transferred to a rearing cage, they began to transform themselves into chrysalids. The moths which emerged after about twelve days, were identified as belonging to the species *Euproctis latifascia* of Walker, who describes the female as follows:—

White. Antennæ with testaceous branches. Abdomen brown, white at the base, luteous at the tip. Length of the body 6 lines; of the wings 20 lines.

Hab.—Nepaul.

According to Sir G F Hampson, the species is identical with Walker's *Euproctis antica* and *E. postica*, and Moore's *E. abdominalis*, which have been described thus:—

Euproctis antica, Wlk. ♂ and . White head, palpi, fore part of the thorax and fore legs. luteous in the male, testaceous in the female.

Female.—Abdomen and fore wings with a very slight testaceous tinge. Length of th body 5-7½ lines; of the wings 12-18 lines.

Hab.—Nepaul, Hong Kong, India.

Euproctis postica, Wlk. ♀. White. Palpi porrect, smooth, hardly extending beyond the head; third joint conical, not more than one-fourth of the length of the second. Antennæ very broadly pectinated. Abdomen brown above; apical tuft, small, white. Legs pubescent; hind tibiæ with four long slender spurs. Wings rather short. Fore-wings rounded at the tipes; exterior border convex, very slightly oblique. Length of the body 6½ lines; of the wings 14 lines.

Hab.—Hindostan.

Euproctis abdominalis, Moore, ♂ and ♀. Cream-white; abdomen blackish; and tuft ochreous; legs white.

Expanse, ♂ 1 $\frac{1}{10}$, ♀ 1 $\frac{3}{10}$ inch.

Hab.—Dharmsala.

Allied to *E. postica.* Wings comparatively longer and narrower.

2. THOSEA CERVINA, MOORE.

(Sub-ord. Heterocera, Fam. Limacodidæ)

In July 1894* were received from Messrs. Finlay, Muir & Co. specimens of live cocoons, the caterpillars of which were reported to have done a good deal of damage to tea plants on the Rungamuttee garden in Jalpaiguri.

From the cocoons, two moths, a male and female, were successfully reared in the Museum; these, however, proved to be unrepresented in the Museum Collection, but they were so far identified as belonging to the genus *Thosea*. For more precise determination, the female moth was sent to Sir G. F. Hampson of the British Museum who very kindly identified it as *Thosca cervina*, Moore, His description of the moth is given below:—

Male.—Head, thorax, and abdomen red-brown. Fore-wing silky gray-brown, with a dark speck at end of cell, and a slightly incurved line from costa just before apex to near outer angle which is red-brown with a pale outer edge. Hind wing and underside dull blown. Antennæ with basal joint pale; a conspicuous white spot at end of fore tibia.

Female.—With the sub-marginal line of fore wing erect; the basal joint of antennæ dark: no white spot on tibia.

Larva green, with a yellow-bordered dorsal irregular band, linear and purplish anteriorly, dilated at middle and cleft behind, purple streaked, and with the angles at middle red; anterior and posterior subdorsal spinous tubercles; lateral and sublateral series of longer tubercles.

Hab.—Sikkim; Ceylon. *Exp.* ♂ 38, 44 millim.

The remedial measures suggested were that children might be employed to remove and destroy the caterpillars. If this were carefully done, and if also the cocoons were searched for, in and on the ground near the affected trees, and were destroyed, it would (if not of any immediate benefit) at any rate be likely to prevent or to alleviate a reoccurrence of the pest in a future year.

3. THOSEA DIVERGENS, MOORE.

This insect is another addition to the Indian Tea pests, of the genus *Thosea.*

In March 1897, specimens of a living cocoon were sent to the Museum by Mr. J. W. Fleet, with a note, that they were taken from the Bishnauth Tea Gardens, Darrang, Assam, where they had been doing damage to tea bushes.

From the cocoons, several moths emerged in the latter end of the month. They appeared to be new to the Museum collection and were forwarded to Sir G. F. Hampson who determined them as belonging to the species *Thosca divergens* Moore,= *Aphendala divaricata* Moore.

As the Museum Library does not possess Mr. Moore's description of *T. divergens*, it is not printed here, the description of *A. divaricata*, however, is quoted below.

Aphendala divaricata ♀. Upper-side pale purplish, brownish-ochreous. Forewing with a slender dark ochreous-brown band curving upward from posterior margin at one-third from the base to one-third before the apex, and from which a straight erect similar band extends from its costal end to the posterior angle. Body dark ochreous-brown. Expanse 1⅝ inch.

Hab.—Silcuri. Cachar.

4. BELIPPA LOHOR, MOORE.

(Sub-ord. Heterocera. Fam. Limacodidæ.)

In March 1897, Mr. W. J. Fleet forwarded to the Museum several living specimens of cocoon, with the statement that he had collected them from the Salonah Tea Estate, Assam. About the same time similar (live) cocoons were also sent to the Museum through Dr G. Watt, Reporter on Economic Products to the Government of India, as infesting tea plants in the Doom Dooma Tea Gardens, Dibrugarh, Assam.

The samples of cacoons were separately confined in a breeding cage, from which, after a lapse of a week, moths began to emerge. These on examination proved to belong to the genus *Belippa*; the species being new to the Museum collection.

On submitting specimens of the moth to Sir G. F. Hampson for identification, he pronounced it to be identical with *Belippa lohor*, Moore, the female being almost indistinguishable from that of *Belippa laleana*, Moore, and hitherto unknown to entomologists.

* The account of this pest should have appeared in the preceding number of *Indian Museum Notes*, but owing to the delay in ascertaining the identity of the species it was withheld.—Ed.

Mr. Moore describes the male, as deep ferruginous: fore-wing with patches on the disc, and a small patch at the apex, black hind wing with a triangular hyaline space from exterior margin; the anterior and abdominal margins fuliginous-brown; thorax with two black spots in front, and one on each side; base of abdomen black. Expanse 1⅛ inch.

Hab.—Cachar, Java.

5. ASTYCUS LATERALIS, FABR.

(Order Coleopetera, Fam. Curculionidæ.)

Through Dr. G. Watt, Reporter on Economic Products to the Government of India, were received in the Museum in July 1897, specimens of a weevil said to be attacking tea plants in Assam. The original sender wrote concerning them that "they came during one night in thousands and simply stripped the bushes they were on." Fortunately they are easy to catch.

The specimens proved to be the same as *Asticus lateralis*, Fabr., which has previously been recorded as attacking various plants in different parts of India.

In 1889, Mr. Beck submitted specimens of this insect for examination, and reported that they attacked the leaves of the "Some" plant in the Raj Gardens, Darbhunga. In Vol. II, *Indian Museum Notes*, page 151, it is referred to as "a small greenish weevil reported in the beetle stage as defoliating mulberry (*Morus*) bushes in Rangoon. Also thought to be the species which has been reported by Mr. Thompson as tunnelling into the timber of Chir (*Pinus longifolia*) in the North-Western Provinces; in this case the injury is no doubt done by the larvæ of the insect."

6. DIAPROMORPHA MELANOPUS, LACORD.

(Order Coleoptera, Fam. Chrysomelidæ.)

In July 1897, specimens of a beetle which proved to be *Diapromorpha melanopus*, Lacord, were sent to the Museum by Messrs. Williamson, Magor & Co. who reported that it had been doing damage among the tea bushes on one of their Assam estates in the Jorehaut district.

This insect (known as the "Orange" beetle) is commonly found in tea gardens in Assam, where it no doubt does a good amount of injury by eating up the tender stems of tea-shoots.

Specimens accompanied by complaints of damage done by it are annually sent to the Museum, but no action, it appears, has hitherto been taken to ascertain the life-history of the pest.

7. CREMASTOGASTER ROGENHOFERI, MAYR.

(The Red and Black Ant of the Tea Bushes).

In his report on the "Pests and Blights of the Tea Plant of Assam, 1898," Dr. G. Watt. Reporter on Economic Products to the Government of India, makes mention, in page 257, of a red and black ant which he had observed infesting tea bushes in Assam.

His elaborate account of the habits, etc., of the insect is very interesting, but his identification of the species with *Cremastogaster contenta*, Mayr., is incorrect. Dr. Watt was good enough to present specimens to the Entomological Section of the Indian Museum, these are undoubtedly identical with authentically named specimens of *Cremastagaster rogenhoferi*, Mayr., in the Museum collection.

To make quite certain, a few examples of the insect were despatched to Dr. Forel, of Zurich, who confirmed the identification as "*Cremastogaster rogenhoferi*, Mayr., one of the commonest species of India."

8. EUPROCTIS CATERPILLAR.

On the 19th March 1897, from Dr. G. Watt, Reporter on Economic Products to the Government of India, were received specimens of a caterpillar reported as doing a deal of damage to the tea bushes in Darjeeling. The following is an extract which he forwarded regarding the pest:—

"A new sort of this blight has developed. A blackish-brown hairy species, they attack the old leaves and strip the trees. This pest does all its ravages at night and hides itself under clods and stones during the day. I have boys on catching same thousands daily. They appear on the dry ridges and are not found in any damp hollows. They have stripped some 50 or 60 acres on an adjoining garden and are now attacking the bark. On lower portions of Lebong and M. S. they have now appeared and are now doing considerable harm. I am sending you a bottle-full in spirit. I fancy they will disappear with rain, but of this there is no sign."

The specimens appeared to be the larvæ of a Lymentriid moth probably of the genus *Euproctis*, and not unlike the tea caterpillars sent in by Messrs. Andrew Yule & Co. from the Darjeeling district. (See p. 180).

9. PSYCHID CATERPILLAR.

In July 1897, specimens of a bag-worm said to be doing great injury to tea plants in the Golaghat district, Assam, were forwarded to the Museum through the Secretary, Agricultural and Horticultural Society of India.

The specimens proved to be the larvæ of a Psychid moth probably belonging to a species hitherto undescribed. We have only a few examples of the larva-case of this insect in our collection, but unfortunately we possess no moths, and Sir G. F. Hampson does not mention this species in his catalogue of moths of British India, Ceylon and Burma.

The most curious thing noticeable in this interesting group of moths is their larva-cases or protective coverings, which are usually composed of a silk lining with twigs, grass, and bits of leaves or vegetable matter attached on the outside, and are so constructed as to resemble little bundles of dried sticks, leaves, etc. In this insect, however, the larva-case is smooth and is covered with a coating of very finely divided vegetable matter and exactly resembles a thorn.

10. COLEOPTEROUS LARVÆ.

In July 1897, Mr. D. Hooper, Curator of Economic Museum, sent to the Indian Museum specimens of grubs reported as tea pests for identification. He wrote:—

"A correspondent in Nazira Division, Sibsagar, has sent me the accompanying bottle of white grub (*Lachnosterna impressa*) as a tea pest. Most of the smaller forms seem stages of the larvæ of that beetle, but I cannot think the very large ones can be the same species. I shall be much obliged for your opinion and, if possible, determination. I have found the very large one all over Assam imbedded in hard mud-houses of which I send a sample. It is particularly common in hard clay soils and does much damage to rice. These I at first mistook for queen whiteant houses until I dug them out for myself and found them invariably occupied by identically similar larvæ to the large ones herewith supplied. They are no doubt a species of *Lachnosterna*, but are they *L. impressa*

"I shall be very glad of any suggestions, more especially whether the very large larvæ have been known to injure the tea in the event of their being pronounced distinct from the smaller form."

The specimens proved to belong to two different species of insects, namely:—The large grubs are the larvæ of a Melolonthine beetle probably belonging to the genus *Lepidiota*, and the smaller ones are apparently the immature forms of *Lachnosterna impressa*.

11. COCCIDS.

Four bottles containing specimens of scale insects reported as infesting tea plants in the Darjeeling district, were received in the Museum through the Reporter on Economic Products to the Government of India. The following particulars regarding the insects are taken from his forwarding letter, dated 28th May, 1897 :—

'No. 1, seems somewhat like *Aspidiotus flavescens* and is said to be the most dangerous of the series. It attacks the young twig of young tea, the scale-insects inserting themselves below the bark and thus raising and distorting it, in older twigs the life seems sucked out of the plant through this rupturing of the bark and the withdrawal of the sap. The young insects are alive and seen escaping."

"No. 2, is said to be a twig with long white blotchess."

"No. 3, a twig with large wax insects."

"No. 4, similar insect of smaller size and with orange-coloured central portion."

The specimens proved to belong to four different kinds of Coccids, namely :—No. 1 consisted of badly preserved specimens of larvæ apparently of *Aspidiotus theæ*, Mask; No. 2, consisted of examples of an unknown Coccid not represented in the Museum collection; No. 3 consisted, of a few larva-scales probably belonging to the species *Ceroplastes ceriferus*; and No. 4 contained specimens of a Coccid hitherto not reported as occurring in India.

Specimens Nos. 2 and 4 were forwarded to Mr. W. M. Maskell for identification, and his report on them is given below :—

"The two parcels of tea leaves with Coccids. One of these insects is evidently a *Pulvinaria*, but only the white cylindrical cottony sacs remain: the insects themselves (as usual in the genus) have fallen off: therefore I cannot identify the species.

"The other (No. 4), of which you sent three specimens and a small coloured drawing, is a *Ceroplastes*. The specimens are not sufficient for clearness. They seem to me to be, nearly certainly, either *C. vinsonii*, Sign. (Mauritius), or *C. floridensis*, Comst., which Green reports on tea in Ceylon. Very probably both these are the same species; but your insects are not in the full-grown stage or at least I think not. Every character corresponds to *C. vinsonii*, but also *nearly* all to *floridensis*. If you could let me have undoubtedly adult specimens and larvæ, I should be more positive. However, the thing seems to be one or other of the two species named."

12. CERONEMA SP. [COCCID].

In May 1897, the same officer forwarded to the Museum specimens of tea leaves attacked by scale-insects. No report accompanied the specimens and no locality was mentioned in the forwarding note.

The insects appeared to be new to the Museum collection and were forwarded to Mr. W M Maskell who very kindly identified them as belonging to the genus *Ceronema*. He wrote, "this is a peculiar and abnormal form which I have had a few months ago from Japan, on *Ilex crenata* and an unnamed plant. I am very much inclined to attach it to my genus *Ceronema* of 1894: the main difference from the single species *Cero. banksiæ* being that the curling white processes in your insect spring from the medium region and curl outwards, while in *C. banksiæ* they are marginal and curl inwards. But I have not yet made up my mind, at least on some minor points."

VI.—SOME BENEFICIAL INSECTS IN INDIA.

The following letter from the Superintendent of the Indian Museum, to the Honorary Secretary to the Trustees, covers a valuable report from Mr. E. Barlow, the Assistant in charge of Entomology, on this subject:—

With reference to your endorsement No. 187-RR, dated 27th September, 1897, forwarding a letter No. 1427-39-2, dated 18th September, 1897, from the Officiating Under-Secretary to the Government of India, together with copies of correspondence from the Government of Madras Nos. 634 and 635, dated 27th July, 1897, relating to the very promising subject of utilizing Lady-birds and other natural enemies of the insects pests of the country, I have the honour to submit the following report by Mr. E. Barlow, the Assistant in charge of Entomology:—

"In India there is already known a good number of indigenous insectivorous insects belonging to the three orders of Coleoptera (beetles), Diptera (two-winged flies), and Hymenoptera (Ichneumon flies, etc.), which have proved to be more or less beneficial to agriculture by keeping down insect pests.

"I.—SOME BEETLES KNOWN TO BE DESTRUCTIVE TO PESTS.

"(*a*) Among the Lady-birds I may mention—

"(i) *Chilocorus circumdatus* Schonh, which is said to prey upon the brown bug (*Lecanium coffeæ*) of coffee plants in Ceylon.

"(ii) *Scymnus rotundatus*, Motsch, which is parasitic upon the white bug (*Pseudecoccus adonidum*) of coffee bushes in Ceylon.

"(iii) *Platynaspis villosa*, Mulsant, attacks the scale-insect (*Icerya ægyptiacum*) in Calcutta.

"(iv) *Vedalia fumida*, var. *roseipennis*, Muls., said to prey upon the Coccid *Icerya ægyptiacum* in Calcutta.

The last named was submitted to Mr. L. O. Howard, United States Entomologist, for identification who wrote regarding it (see *Indian Museum Notes*, Vol. 4, No. 1, p. 28). 'It is interesting to find that this Coccinellid is not distantly related to the well-known *Vedalia cardinalis*, Mulsant, which Mr. Albert Kœbele of this department, brought from Australia some years ago, and which destroyed *Icerya purchasi* on our Western coast. It is Mulsant's *Rodolia roseipennis*, which according to Crotch's revision of the Coleopterous family Coccinellidæ, is a colour variety of *R. fumida*, Muls. Accepting the nomenclature given by Crotch, the name of the insect is therefore *Vedalia fumida*, var. *roseipeanis*, Muls.' It may be mentioned that the *Vedalia cardinalis*, here referred to is an Australian species of Lady-bird which on introduction into America is said to have at once cleared thousands of orange trees of destructive scale-insects of the species *Icerya purchasi*.

"(*b*) Among beetles other than Lady-birds are—

"(v) Aliger beetle of the species *Cicindela sexpunctata*, Fabr., which devours the rice-sapper (*Leptocorisa acuta*) in Chumparun.

"(vi) A Carabid beetle *Calosoma orientale*, Hope, which destroys the young locusts of the species *Acridium peregrinum*, Oliver.

"II.—SOME DIPTERA (TWO-WINGED FLIES) KNOWN TO BE DESTRUCTIVE TO INSECT-PESTS.

"(vii-viii) *Syrphus nietneri*, Schinr., and *S. splendens*, Dolesch, the larvæ of these two flies are said to prey on the coffee Aphis (*Aphis coffeæ*) in Ceylon.

"(ix) *Anthomyia peshawarensis*, Bigot, parasitic upon the eggs of the locusts (*Acridium peregrinum*) in India.

"(x) *Masicera subnigra*, Wulp., parasitic upon the larvæ of the moth *Olene mendosa*, Hubn., which attack tea plants in Darjeeling.

"(xi) *Musicera castanea*, Wulp., said to prey upon caterpillars of the moth *Leucania extranea*, Guen., which attack the young paddy plants in Bengal.

"(xii) *Masicera dasychiræ* Wulp., parasitic upon caterpillars of the moth *Dasychira thwaitesii* which does much damage to tea plant and sâl tree in Assam.

"(xiii-xiv) *Democticus etrigipennis* Wulp., and *Calodexia lasiocampæ*, Wulp. The larvæ of these two flies are parasitic upon a hairy Lasiocampid caterpillar destructive to rice in the Central Provinces.

"(xv) *Miltogramma 12-punctata* Wulp., which preys upon the locust (*Acridium peregrinum*) in India.

III.—SOME HYMENOPTERA (FAMILY CHALCIDIDÆ) KNOWN TO BE DESTRUCTIVE TO INSECT-PESTS.

"(xvi) *Chalcis* (*Brachymeria*) *euplœa* Westw., preys upon the Dooars tea and sâl caterpillar *Dasychira thwaitesii*).

"(xvii) *Cotesia flavipes*, Cameron parasitic upon the Sorghum-borer (*Diatræa saccharalis*).

"(xviii) *Apheinus theæ*, Cameron, a minute fly-like insect that attacks the tea scale bug (*Chionaspis theæ*, Mask).

"(xix-xxvi) *Cirrhospilus coccivorus*, Motsch., *Encyrtus nietneri*, Motsch. *E. paradisicus*, Motsch. *Scutellista cyanea*, Motsch, *Marietta leopardina*, Nietner, *Cephaleta purpureiventris*, Motsch., *C. brunneiventris*, Motsch., and *C. fusciventris*, Motsch., are said to be parasitic upon the Brown bug (*Lecanium coffeæ*) of coffee plant in Ceylon.

"(xxviii) *Chartocerus musciformis*, Motsch., said to attack the white bug (*Pseudococcus adonidum*) of coffee plant in Ceylon.

"(xxviii) *Pteromalus oryzæ*, Cameron, a minute coppery green-coloured Ichneumon-fly believed to be parasitic upon the wheat and rice weevil (*Calandra oryzæ*) in India.

The above are some of the indigenous species of insect-parasites of insect-pests that have come to light without any special inquiry, and no doubt systematic research (which certainly ought at some day to be undertaken, would reveal many more. In the face of Mr. Barlow's report it can hardly be hoped that the introduction of a single foreign species of Lady-bird—even if that species be able to hold its own against the native species—will have any very marked effect.

PRODUCE AND PLANTING.

Some Excuse for Retrenchment.—Commenting on Mr. Geo. Seton's table of the workings of Indian tea companies the "Grocer" sees some "excuse for the Indian tea planters' recent anxiety to retrench." The forty-five registered Indian tea companies did worse financially during 1898 than they did in the previous year. Then the profit on their joint capital was, as our authority shows, only 5.56 per cent., whereas in 1897 it stood at 5.98 per cent. This diminution in their profits is elaborately demonstrated in the tables referred to, wherein it is seen that the paid-up capital was £7,017,865, against £7,215,498 in 1897; also that the "cultivated area" was 175,427 acres, instead of 173,071 acres in the former year; that the actual sale weight of the crop was limited to 65,706,075 lb, as opposed to 65,726,558 lb. in 1897; and that the "ratio expenses to receipts" were 84 per cent, as compared with 82 per cent in 1897, and 77 per cent only in 1896. "Here," says the "Grocer," "certainly, is matter for serious consideration, and we may proceed to point out a few facts embodied in Mr. George Seton's statement which cannot be easily gainsaid. We have already alluded to the capital involved, the lands planted, the aggregate quantity of tea produced, and the net average cost of its production. A further question of interest is the profits realised. These, we find, varied from 0·11 to 4·01 pence per lb, as many as seventeen companies (out of forty-five under review) making less than 1d per lb profit on the whole year's working, and only four or five managing to earn about 2d per lb over and above their ordinary outlay to keep their concerns in going order. It is true that two companies, more fortunate than the rest, succeeded in netting a gain of 3.21 and 3.87 pence per lb, and one as much as 4.01 pence (quoted above), but these were rare exceptions, and served only to accentuate the poorness of the returns that fell to the lot of other cultivators and shippers acting in the interests of British consumers. Next we notice the rates of dividend, the natural and final test of all industrial undertakings, and these, on the whole, turn out to be smaller than they were in previous seasons. Only a single company, the Brahmapootra, was successful enough to pay a dividend of 15 per cent; followed at a short distance by the Amalgamated Estates, the Assam, the Dooars and the Doom Dooma companies with their 12½ per cent 'divi'; and a little further behind came the Jorehaut with 11 per cent, and the Balijan, Consol. Tea and Lands, Jokai, Lebong, Moran and Rajmai tea companies with their distribution of 10 per cent on their paid-up capital. An 8 per cent dividend was declared by the British Assam, Lankapara and Meenglas proprietors; 6 per cent by the Chubwa Company; and 5 per cent by the Darjeeling, Derby, Eastern Assam, Jhanzie, Longai Valley, Majuli, Moabund, Sephinjuri Bheel and Tingri interests. Others doled out the more modest rates of 2 per cent to 4½ per cent, whilst the payments of eleven Indian tea companies were simply nil; and this notwithstanding that the total receipts from the 45 workings were £2,383,000, as contrasted with £2,304,000 sterling in 1897, when the profits were larger. As we observed a twelvemonth ago. All this was too well-known beforehand to occasion any surprise amongst those acquainted with the secret movement of the tea trade at home; and there can be no doubt that the combined ill-effects of the '1897' famine, the frontier disturbances, and damage done to crops and outbuildings by earthquakes in our Indian Provinces, told seriously upon the industrial pursuits and conditions of life of the native populations. Bearing these cross circumstances in mind, it is no wonder that, though an enormous tea crop was raised, its quality generally was that of a poorer class, which consequently failed to yield a higher price with which to defray the heavier expenses of cultivation, and contribute towards more handsome dividends."—*H. and C. Mail*, Aug. 25.

Correspondence.

To the Editor.

PLANTERS' ASSOCIATION OF CEYLON.

RUSSIAN DUTIES ON TEA.

SIR,—I enclose for publication copy of a communication received from Government on the subject of the duties levied on Tea by the Russian Government.—I am, sir, yours faithfully,

W. D. GIBBON, PER H. W. GAVIN.

Colonial Secretary's Office, Colombo, 25 Aug. 1899.

SIR,—Adverting to my letter of the 17th, January 1899, forwarding for the information of the Planters' Association, a copy of a Despatch from the Secretary of State for the Colonies together with a copy of a communication from Her Majesty's Ambassador at St. Petersburg, on the subject of the duties levied on Tea by the Russian Government, I am directed by His Excellency the Lieut. Governor to forward for the information of your Association, a copy of a despatch, received through the Secretary of State, from Her Majesty's Ambassador at St. Petersburg to the Marquess of Salisbury reporting certain alterations in the duties payable on imported tea under the Russian Customs Tariff.—I am, sir, your obedient servant,

(Signed) J. J. THORBURN, for Colonial Secretary.

[*Copy Referred to.*]

St. Petersburg, July 12th, 1899.

MY LORD,—I have the honor to report that according to a decision of the Council of the Empire, passed on the 4/16 June, 1899, and published in the Bulletin of Laws of the 25th June—7th July, 1899, the following alteration under the Russian Customs Tariff in respect of the duty payable on tea are decreed :—

1 Brick Tea, Black and Green, imported into Russia, across the European frontier to pay duty at the rate of 11 Roubles, 25 Copecks per poud (former duty 31 Roubles 50 Copecks per poud.)

2. Black, flower, green and yellow teas imported at the frontiers of the Steppe, Irkutsk and Cis-Amur Governor-Generalship's to pay duty at the rate of 22 Roubles 50 Copecks per poud. (Former duty 19 Roubles 50 Copecks per poud.)

With the completion of the Russian Lines of rail to the Pacific the rates of duty on tea will be subject to further consideration.—I have, &c.,

(Signed) CHARLES S. SCOTT,

The Marquess of Salisbury, K.G., &c., &c., &c.

THE PROPOSED ABOLITION OF THE ENGLISH TEA DUTY.

Kandy, August 26.

SIR,—I enclose copies of some correspondence *re* the abolition of the English Tea Duty, which will no doubt be of interest to your readers.—Yours faithfully,

W. D. GIBBON,

Per. H. W. GAVIN,

Acting Secretary to the Planters' Association of Ceylon.

Kandy 23rd May, 1899.

The Secretary, Indian Tea Association, Royal Exchange Building, Calcutta.

DEAR SIR,—Adverting to my letter of the 14th ultimo, I now herein annex for your information and guidance copy of Resolution passed by the Committee at a recent meeting when your letter was considered.

In terms of the first part of the resolution I transmit herewith printed copies of the correspondence that passed between a member of the Committee (Mr. E. J. Young) and some of the leading London Brokers which probably to a certain extent inclined the Committee to take the view expressed in the resolution to which you draw attention. I also hand you extract of a speech made by the Chairman, Planters' Association on the subject at the annual general meeting.

It may be added for further guidance that the Committee of the Planters' Association hesitates to support an agitation for abolition of the Duty on the ground that there would be no check on teas entered for home consumption and that without this check, the market might be flooded with *rubbish teas*, which it is understood under present conditions are stopped at the Customs. There is also some doubt whether a reduction of the Duty would directly benefit the consumer and would not chiefly benefit the *low priced Teas* of China and other competing countries.—I am, Dear Sir, Yours faithfully,

(Signed) A. PHILIP,

Secretary to the Planters' Association of Ceylon.

RESOLUTION REFERRED TO.

"That for the guidance of the India Tea Association, copies of the correspondence that passed between Mr. E. J. Young and the London Brokers be forwarded with connected papers, and that the India Tea Association be asked if they will favor the Planters' Association with a full expression of the views of the India Tea Association in support of the opinion so strongly held that the total abolition of the English Import Duty should be agitated for."

Indian Tea Association, Royal Exchange Building,

No. 463—O. Calcutta, 17th August.

The Secretary, Ceylon Planters' Association.

ABOLITION OF THE ENGLISH IMPORT DUTY.

DEAR SIR,—I am directed by the General Committee of the Indian Tea Association to address you, in continuation of my No. 334-O., of 16th June, and with reference to your letter of 23rd May, on the above question.

The resolution passed by your Committee, and the papers to which it refers, have had their attention. In giving expression to the views held by my Committee it will, I think, be convenient to first of all deal with the points referred to in your papers.

The reasons given for the attitude taken up by your Committee may, I think, be summarised as follows :—

1. That abolition will remove all check upon teas entered for consumption and that thus the market might be flooded with "rubbishy" teas,

2. That reduction or abolition might chiefly benefit low-priced teas from China.

3. That the time is not propitious for agitating the question.

In regard to the first objection I am to point out that whether an article of food is dutiable or not it is subject to the same laws in respect of its fitness for human consumption. Abolition would not remove any of the checks imposed as obstacles to adulteration so far as the law goes, and the question resolves itself therefore into this : as to whether or not the Customs no longer having to carefully weigh the tea would relax their vigilance, and whether, if they did, other checks in existence, or which might readily be introduced if required, would not operate sufficiently. Is there any reason to suppose that adulterated tea would escape detection when other imported non-dutiable foods do not ? One does not hear complaints on this score in connection with grain, cheese, butter, eggs, tinned provisions, and so on, and my Committee think the objection is hardly worth considering. They observe, however, that you use the word "flooded" in connection with the expression "rubbishy teas," and they think you may include under the adjective "rubbishy," teas that are not adulterated in any way, but merely extremely poor. If so, they would ask you whether these come into the question at all. My Committee are under the impression that tea, however poor, so long as it

is tea, and not unfit for human consumption, cannot be stopped under present conditions, any more than it would be in the absence of an import duty.

Your second objection is of course the more important and it covers more ground. Arguments supporting this objection are all based on the fact that as the duty of 4d bears a greater proportion to the average cost of China tea in bond than it does to British grown tea, reduction or abolition of duty would amount to a larger percentage in the case of the former than of the latter, and on the idea that this relatively larger reduction would have an appreciable effect upon consumption, also relatively. It is admitted that reduction of duty in the past has tended to increase consumption as a whole, and that further reductions would have similar effects. Why should the relative effects be different ? The reduction of duty from 6d to 4d did not check the progress of British-grown teas, and my Committee do not believe that a further reduction would do so. They cannot find anything in the history of India and Ceylon tea in any country to support the assumption that a high or low duty affects the progress thereof in relation to China tea. British tea has won its way so far because it is a better article, and where known meets better the public taste, and, in the opinion of my Committee, it will continue to hold its own in any field where it has an equal chance. Therefore anything that tends to increase the consumption of tea as a whole will be to the benefit of India and Ceylon. They further direct me to point out that this argument has never yet been brought forward in any other connection. India and Ceylon have never considered the question of duties when attacking new markets, but have spent money freely in countries where tea was free, and where duties range from 1d up to say 1s 10d per lb. in the United States there was no duty when the joint campaign was begun there, nor did anyone suggest that it would be advisable to attack Russia first because she levied a one and tenpenny duty. On the contrary the 10 cents duty levied by the United States in consequence of the Spanish war was looked upon as a misfortune, and India and Ceylon do not so far as my Committee know consider its imposition an advantage to them in endeavouring to obtain an increased share of the American trade in tea. My Committee then contend not only that all experience bearing upon the subject is against the assumptions upon which the second argument is based, but that the policy of both Ceylon and India in capturing fresh markets has hitherto ignored all considerations of the kind. They think that the same principles may be applied in endeavours to expand old markets as to the exploitation of new ones.

With regard to the remarks made by your Chairman in this connection about the blending of cheap common teas, I am desired to say that, in the opinion of my Committee, everything which tends to lessen the cost of delivering good teas to consumers will tend to an increased use of such teas in blends. The 'shilling canister' undoubtedly has a depressing effect upon wholesale prices, and your Chairman is no doubt correct in his description of the present tendency in blending, but my Committee think that the best way of curing the evil is to make an honest shilling canister of British-grown tea possible.

The third point I have noted above is that the time for agitating for the reduction or abolition of duty is not propitious. My Committee would certainly not advocate an agitation which was not backed very strongly by proprietors and all interested in Indian and Ceylon tea as growers, but granting reasonable unanimity, which is the first thing to be obtained, my Committee advocate agitation at every possible opportunity. It is true that the British Government are meantime committed to an unprecedented rate of expenditure and may be unable to forego immediately any existing source of revenue, but a further expansion of revenue, or a change of policy, or of Government, may come very soon, and sooner or later may certainly be expected. It is very desirable, therefore, that Ceylon and India should come to one mind on this subject now, and be ready to take advantage of every opportunity to strengthen the sentiment which already exists in favour of a "Free Breakfast Table" in the United Kingdom.

I now turn to a matter upon which my Committee lay considerable stress, but which is only hinted at by one of the correspondents quoted in the papers you sent to this Association. I mean the saving in London warehouse charges—now felt to be so grievous a burden—which would inevitably follow abolition of duty. A duty imposes upon any trade affected, charges amounting to a considerable percentage in addition to such duty. In the case of tea this percentage would be but a moiety of the saving which Messrs. Walker, Lambe & Co. refer to when saying "the conditions under which teas must be entered and warehoused and handled for the mere purpose of securing and collecting the duty are necessarily cumbersome and expensive." When added together all these charges direct, and incidental, must be very heavy indeed, whilst if importers were freed from the necessity of going into 'Bond,' it is obvious that the field for warehousing would be extended, and the possibility of reducing such charges as would still be incurred much increased. At present, as you are aware, the London Warehousing Companies refuse to consider any suggestion to reduce charges, and under existing conditions they have practically a monopoly. My Committee believe that abolition of the duty would weaken, if it did not destroy this monopoly, and that a further reduction of the then remaining charges would be possible. These advantages would only accrue in the event of abolition, and this is why my Committee strongly advocate an agitation with this end in view in preference to asking merely for a reduction of duty.

In urging upon you these further reasons for agitating this question, my Committee would call attention to the fact that if the argument of what I may call relative effects upon the trade of British and China-grown teas holds good at all, it is good against a reduction of any charges that affect all teas imported into London and which are levied upon weight. This fact of itself seems to them to reduce the argument to an absurdity, and they trust your Committee will not be led to accept a theory which would logically debar any endeavour to reform any charges coming within the above category.

I regret that there has been so much delay in answering your letter, but my Committee thought that figures from Australia, where rates of duty have varied much, and are still variable, might throw some light on the discussion Those from New South Wales are only just to hand. These figures, so far as they go, show that in Australia experience does not justify the fears expressed in regard to the future in England should the duty there be reduced or abolished. Abolition in New South Wales did not stop the decline of the China trade nor reduction in Victoria a very largely increased share to British-grown teas in a trade of greater total volume, and the causes for variations from year to year in the relative progress of the rival Empires, must be sought for elsewhere than in alterations of duties.

I send copies of the statements received which relate to Victoria, New South Wales and Queensland for your information.

My Committee hope that you will see your way to join them in urging upon both the Associations in London the desirability of pressing for abolition.—Yours faithfully, J. Taylor, Acting Secretary.

Accompaniments :—Three Statements, A, B and C, (The first shows the imports into New South Wales between 1889-98 with the duty imposed each year; the second those into Victoria and the third those into Queensland.

The earliest records available shew that in 1853 a duty of 3d per lb. was in force in Victoria. The following year the duty was raised to 6d per lb., and no alteration took place till 1865 when it was lowered to 3d per lb. and remained so till the 31st

December 1889. From the 1st January 1890 the duty was reduced to 1d per lb., but on the 13th July 1892 it was again raised to 3d per lb. and has remained so ever since. H. V. P. Wollaston,

Secretary for Trade and Customs.

Department of Trade and Customs, Melbourne, June 28th, 1899.

THE BRITISH TEA DUTY.

Dessford, Nanuoya, 12th Sept. 1899.

Sir,—The attitude of Ceylon tea producers towards the question of the abolition of the English import duty on tea, is, I think, that of sitting on the fence until they are convinced that they will benefit by such abolition. This is my excuse for trespassing on so much of your space, in the hope of inducing a careful consideration of the question.

It is a trade axiom that the reduction of the selling price of any commodity to the consumer stimulates the consumption of that commodity, the converse of course being equally true. As an example, have we not always seen a prolonged season of low prices in the tea market followed by a rise, and we are told in the Brokers' circulars that "the recent low prices have stimulated consumption" and so reacted on the selling price.

Hitherto the reduction in price to the seller has been entirely at our expense, and the immutable law of supply and demand made such a lowering of price necessary in order to get the tea consumed.

When it is suggested that we should cheapen the cost of our teas (which, other things being equal, must mean an eventual reduction of price to the consumer) by the abolition of the one pound draft or the reduction in warehouse charges, &c., we have the whole of the producers with us, but, when the reduction or the abolition of the duty is mentioned, many producers seem to think that some occult force will be set in motion, by which the laws of supply and demand would be stopped if not eversed.

What would naturally follow the abolition of the duty is as follows: For the first year, possibly longer the 4d saved would be divided in some proportion between the producer, the middleman, and the consumer, but sooner or later the consumer would be the only one to benefit so far as price is concerned, the middleman would do a larger turnover from the increased consumption and the producer, supposing he is able to keep the ratio of supply to demand as it is at present, would then make the same profit per lb. as at present on a larger number of lbs. The price paid to the producer is and can only be governed by that ratio, always supposing there is free competition and no buyers' combination and the sudden rise in the lower qualities of tea during the early part of this year is to my mind sufficient proof that no such combination exists.

Again, the abolition of the duty reduces the amount of capital necessary to deal in tea and thus helps the small dealer against the large capitalist which in itself would tend to make a buyers' combination more difficult and increase competition, all in the favour of the producer.

In an article communicated to the *Observer* of the 5th inst., the writer bases his arguments largely on the number of gallons of liquid tea drunk, reasoning from his figures that there was no increase from the reduction in duty in 1890, but can he say or does he think that the lower classes do not drink a very much stronger brew than they did formerly?

Our deliveries of Ceylon teas increased nearly 11,000,000 lb. in the year 1890-1891, or the year following the reduction and nearly 19,000,000 lb. in the following year which shows that we certainly did not suffer from the reduction.

He also states that the producer gets a better living out of dutiable articles than out of free, and instances sugar, possibly forgetting that it is the bounty fed beet sugar that has caused the fall and that English consumers are buying their sugar at a lower price than the consumers in the sugar producing continental countries.

In other words if the continent chose to subscribe together in order that the Englishman can have cheap sugar, it is hardly a sound argument to instance it as a free article. Again last year wheat was a most remunerative crop, and I suppose that most shareholders in coffee concerns will agree that that product was as unremunerative as it well could be, the reason having nothing to do with duties, but being merely an instance of supply and demand, and the existing ratio of the one to the other being upset.

There are many other points such as the reduction of warehouse charges, which I have not touched on, as, though important, they are really side issues.

Apologising for the length of this.—I am, &c.

EDWARD ROSLING.

P. S.

			Average. d.
Total deliveries Ceylon tea	1889	30,166,256	10·99
" "	1890	37,652,750	10·56*
" "	1891	53,486,510	10·70
Home consump. only "	1892	64,000,000	10·07

* Duty reduced in April.

We more than doubled our output in four years at the loss of less han 1d per lb.—E.R.

"MUTATO NOMINE."

The *Ceylon Observer* reads the Government of Ceylon a lecture on its apathy in regard to the scientific aspect of planting. Well might we turn upon the Government of Madras, say *mutato nomine de te fabula narratur*, and then declaim in like manner, and with emphasis. In Ceylon they have tea-pests in full bloom, so to speak; they are feeling the effect. The present blights are, the *Observer* is informed, steadily spreading through the planting districts, and as our contemporary says, "if they get a firm hold, it will mean a great deal to the colony, and the Government as well as the planter will feel the sad effects." The ravages of leaf-disease in coffee in Ceylon have not been forgotten. The memory serves as a standing lesson as to the need for prompt action when pests and blights threaten in seeming force. In Madras also, many planters have suffered, and, although the Government has certainly assisted them to a small extent, it still refuses to give the agricultural industry the assistance of a permanent scientific expert. A botanist has been appointed, certainly, and from the fact that his main work hitherto has been with respect to sugarcane-diseases, we judge that he may, at some future time, be allowed to bestow some attention upon tea and coffee. But the appointment of one scientist is not enough for a Presidency like that of Madras, nor is the botany of the Presidency by any means the section that most urgently calls for scientific study. Financial difficulties are decreasing now, and we trust that the Government of Madras will shortly take into serious consideration the question of establishing a well-organized scientific department. There is an admirable model in the United States, and something of the same kind, on a reduced scale, would no doubt prove very valuable here.—*Planting Opinion*, Sept. 9th.

TRAVANCORE TEA SALES.

Average 8·20d. August 25th.

Garden.	Total.	Aver.	Bro. Or. Pek. or Flowery Pekoe.		Pekoe and Unassorted.		Bro. Pekoe.		Pekoe Sou.		Broken and Souchong.		Fannings, Dust, and Various.	
	Quantity.	Price.	Quantity.	Price.	Quantity.	Price.	Quantity.	Price.	Quantity.	Price.	Quantity.	Price.	Quantity.	Price.
Travancore	...2867	6·11												
Arnakal	... 126 p	6¼	15	†6¼	49	†6	45	†6¾	8	5¾	1	5½	8½c	5½
Atchencoil	... 114½c	5¾	—	—	45½c	5¾	23½c	6¼	35½c	5½	4½c	5¼	7½c	5½
BA	... 12	5½	—	—	—	—	—	—	—	—	12	5½	—	5¼
Balamore	.. 180½c	5¾	—	—	125½c	5½	45½c	6¼	—	-	7½c	5¼	3½c	5¾
Beldford	... 160½c	5¾	—	—	96½c	5½5¾	54½c	6	—	—	5½c	6	5½c	—
BM	... 6	5½	—	—	—	—	-	—	—	—	6	5½	—	5½6½
Bon Accord	... 90 p	6¼	—	—	31	6¼	31	6¾	15	5½	—	—	13½c	5¼6½
Braemore	.. 111	6	—	—	49	6¼	34	6¼	—	—	22	5¾	6	5½6
Carady Goody	... 107 p	6	54	5¾6¼	15	5½	16	6	6	5½	—	—	16½c	--
Cherian Malay	... 116 p	6	114p	6 6¼	2	5¾	—	—	—	—	—	—	—	5¼
Corrimony	... 175½c	6¼	—	—	123½c	5¾	43½c	7½	—	—	5½c	5¼	4½c	5
Ellangy	.. 120	5¾	—	—	58	5½5¾	27	6¼	30	5¼	--	—	5	6
Fairfield	... 60	6¼	21	6½	12	6	15	6¾	6	5¾	3	5½	3	—
Glenmary	.. 85 p	6½	38	6½7	24	5¾	—	—	—	—	—	—	23 p	5¾7¾
Glenmore	.. 130½c	6.	—	—	74½c	5½5¾	52½c	6¾	—	—	3½c	5¼	1½c	5
Home	... 160½c	5¾	—	—	100½c	5½5¾	50½c	6	—	—	5½c	5¼	5½c	5
Isfield TC Isfield	... 112 p	5¾	—	—	59	5½5¾	36	6¼	16	5½	1½c	4	—	—
Nagamally	... 38	5½	—	—	—	—	—	—	8	5¼	22	†5½	8	5½
Penshurst	... 103 p	6½	63 p	6¼7½	21	6	—	—	19	5¾	—	—	—	—
Seafield	... 109½c	6½	—	—	73½c	6	34½c	7¼	—	—	1½c	5½	1½c	5¼
South Trav. C Vn	182	6	—	—	67	6 6¼	86	6 6½	29	5½	—	—	—	—
„ „ J	77	6¼	—	—	41	6	29	6¾	-	—	—	—	7	5¼
„ „ K	128	6	—	—	51	6	42	6¼6½	25	5¾	—	—	—	—
SIT Co Kuduwa K	115	6¼	65	6¼7¼	29	5¾	—	—	—	—	—	—	21	5½6½
Stagbrook	... 110 p	7¼	33 p	8 †8	33	7¼	18	†6½	26	6¾	—	—	—	—
Travan T Coy. Pm	65	6¾	7	8¼	32	6	26	7	—	—	—	—	—	—
W	... 16½c	6¾	—	—	16½c	6¾	—	—	—	—	—	—	—	—

In these tables all packages are chests unless othe wise stated. ½c for half-chests; p for packages, prices marked thus † represent the highest offer in the room. In calculating these averages two half-chests or four boxes are taken as equal in weight to one chest.

THE TEA DRAFT DISPUTE.

The Birmingham Grocers' Association in their quarterly report presented at the meeting held on Aug. 22, after stating the conditions agreed to, say:—

The Committee trust that all importers who joined in the movement will also view the settlement in this light. The Committee desire to record that each section forming the joint committee has throughout the negotiations worked together in the fullest accord in a common cause, and where any interests of the one producing country may seem to have been at variance with that of the other, a mutual understanding of unity of action has been loyally adhered to. The new system of weighing teas cannot be put into force until it has received the sanction of H.M. Customs, and a petition will immediately be preferred by importers and buyers to have the alteration carried out. It is hoped that the new regulations may come into force on October 2, but until that date all teas will be sold on the old conditions. In view of the recent cessation of sales and consequent accumulation of teas in London, the Committee urge upon importers the necessity for at once instructing their brokers to offer their teas under the rules of the Regulating Committee formed for the purpose of controlling the supplies to be offered for sale. The Committee congratulate the trade upon having resisted the demands of the tea associations. The result will have a far-reaching effect, as it is now highly improbable that dealers in other commodities will attempt to abolish the draft. While the dispute with the Indian and Ceylon Tea Associations was on hand it was rumoured that one of the members of the Birmingham Association, and a prominent tea dealer, had broken the compact in purchasing Indian and Ceylon teas on the market. Fortunately the Committee were able to give an assurance that such was not the case, and they thank the whole of the traders of the district for loyally supporting the trade associations in the course they adopted for the purpose of enforcing their demands.

MONSTROUS ROSE IN PERADENIYA GARDENS, CEYLON.

Monstrosity is of common occurrence in flowers as in other forms of creation, and it does not seem to effect any one class in particular. Seldom, however, is a more curious and interesting freak seen than that in the case of a rose which Mr. J Ferdinandus, chief clerk at Peradeniya Gardens, has discovered the other day in his compound. This is a well-formed rose flower with stalk, petals and sepals complete, growing out of the ovary of another rose which has shed its petals, who can say but this may be the origin of a new type specially suited for button-holes, as the neat knot (swollen ovary) at the base of the new development seems to be an improvement on the old. fashioned spiny and slender stalk.—*Cor.*

A PRACTICAL TEST OF THE NEW TEA-TRADE CONDITION.

An aggrieved London firm writes to us as follows, adding a practical statement showing the injury wrought by an increased number of tarers:—Even this week numbers of the "Joint-Committee," in defence of their insisting upon separate tares being taken, have said they "don't believe it would make any difference to anybody."

This is a strange argument to use for insisting on a clause to be inserted in an agreement and for petitioning the customs to insist on it also, viz, that it would make no difference to any one. The following however shows the injury inflicted on some, and the difference it may make to a good many of those concerned :—

292 Packages Ceylon Tea, ex "Ophir," of value £650, sold 1st August, 1899, chested as soon as made, and bulked in London.

Tares ran even and average tares were accepted.

There were tared	5 chests at a cost of 1/ each	
	12 chests at a cost of 10d each	£0 15 0
	17 chests.	
There were bulked	74 chests at a cost of 1/ each	
	218 chests at a cost of 10d each	£12 15 8
	292 chests.	
The taring and bulking together...		£13 10 8 actual cost.

Under the Clause G, proposed by the Joint Committee for the so-called agreement, 2nd August, 1899, insisting on separate tares being taken, the charge would have been—

bulking and taring	74 chests at 1/5=	£5 4 10
	218 do 1/2=	12 14 4
	292 packages.	£17 19 2
say extra charge	...	£4 8 6 proposed.

The above were bulked in London, because the Proprietors are of opinion that London bulking is better in several ways than Estate bulking.

Had the London bulking been forced on the Proprietors, as may occasionally happen to every garden Proprietor through the Tea being thrown up by buyers after sale on grounds of irregularity, the same extra charge would be incurred in every case, even if previously Estate-bulked and tares unquestioned, viz. :

and tares unquestioned, viz. :		£4 8 6
and in addition new Warrants at 4d. / new Weight-notes at $2\frac{1}{2}$d.	say=1d. per package	1 4 4
an extra charge proposed by the Joint Committe for reasons known only to themselves		£5 12 10

London, 25th August, 1899.

AUSTRALIAN AGRICULTURAL NOTES.

SYDNEY, Aug. 24.

Yesterday I paid a visit to the Land Office, round which I was conducted. Part of it is devoted to Agriculture, and in the Agricultural Library I saw pamphlets and reports from all

parts of the world. The librarian told me tha Mr. Jackson, the principal of the Hawkesbury Agricultural College, considers the *Tropical Agriculturist* one of the most useful publications he receives. I was introduced to Mr. Campbell, the head Agricultural inspector in the Colony. "Yes;" he remarked, "tea grows like a weed here." In response to further inquiry, he showed me some that had been plucked close to Sydney. He said, however, it would never be a paying industry in this Colony as the labour was too dear compared with cooly labour in tea growing countries, and New South Wales will never enter into competition with Ceylon in that respect. At the present time the Government are experimenting in tea growing in the north of the Colony. "Here's some coffee," he said, showing me a tin full, "as good as you have in Ceylon."

I lent Mr. H. C. Russell, the Government Astronomer, my copy of the *T. A.* and he returned with the following note :—"Very many thanks for letting me see the *Tropical Agriculturist.* I am very pleased with the Magazine, it is full of carefully prepared data valuable to readers."

RAMIE FIBRE IN ALGERIA.

A NEW PROCESS OF EXTRACTION.

A Calcutta correspondent sends us the following interesting extract upon a subject which is of importance to several Ceylon planters at the present time:—The splendid possibilities of the Ramie fibre have long been recognized in the United States as well as elsewhere, but the processes of extracting the fibre have either been defective or too costly, except in China, the land of cheap labor. However, a Parisian House has here on exhibition a machine which, if its claims are justly founded, solves the problem satisfactorily. Along with it were specimens of ramie branches, fibres, balls of binding-wool in various weights and colours, skeins of beautiful embroidery thread, cord and tassel of artistic design and finish, and passementerie trimming. The treatment of the plant is said to consist in the introduction under pressure of carbonic acid gas and the gas of hydrochloric acid, alternately, which in five minutes' exposure so acts on the branches that the fibre is then easily crushed out. As to the details, the exhibitor apparently did not wish to say too much, but as to the results, he affirms that one machine is capable of treating sixteen tons per day of ten hours. A company is said to be forming for its manufacture and control and rumour hints that at least one contract has already been made in Algeria, for all the ramie that a certain property can produce. M. Bachelerie, 60, Rue Canmartin, Paris, is given as the address of the inventor.—*Philadelphia Manufacturer.*

THE CONGO BOTANICAL GARDENS.

VISIT OF THE NEW DIRECTOR TO CEYLON.

We referred a few days ago to a paragraph contributed to the *Morning Leader* by a Belgium correspondent regarding the formation of a botanic garden in the Upper Congo, the Belgian colony in Central Africa. This is probably the first botanic station (or experimental garden, one might say) of the kind which the Belgians have started, much unlike the British

colonies, in which the formation and development of such institutions have long been recognized to be of paramount importance to the prosperity of the land. There is however only one Kew gardens, and how the imagination could dignify an infant botanic station in the wilds of Africa by the name of "Kew" can only be accounted for by the fact that our London Garden, the greatest emporium of plants and botanical knowledge in the world, is a model to copy, though never imitated. The officer appointed, Mr. Leon Pynaert, of Ghent, as Director of the above scheme is also a recent student of Kew. Previously to starting on his new duties, the Belgian Government has sent him out to Ceylon and Java to gain a knowledge of tropical cultivations, especially cacao, coffee and rubber. Having spent a a pleasant fortnight in Ceylon, visiting all the botanic gardens and meeting co-Kewites, Messrs. Nock and Macmillan, he left on the 14th inst. by the ss. "Tonkin" for Java, where he hopes to make a longer stay.

Mr. Pynaert has been particularly pleased with what he has seen of Ceylon, and was agreeably surprised at the advanced state of the civilisation of the country. He could not help contrasting the state of Colombo with electric tramcars, &c., and also of Kandy and Nuwara Eliya with that of Coquilhatville, his headquarters in the Congo, which he said has only sixteen white people, all told.

THE PACKET TEA QUESTION.

SUCCESSFUL PROSECUTION.

The World's Tea Company was summoned at Kingston-on-Thames on August 29, for having unlawfully, and with intent to defraud, applied a false trade description within the meaning of the Merchandise Marks Act 1897 to tea sold by them in packets. The prosecution was instituted by the Surrey County Council, whose inspector, Mr. R A Houghton proved purchasing at defendant's premises in Kingston Market Place on July 30th, a half-pound packet of tea, which on being weighed, showed a deficiency of three drachms twelve grains; and a quarter-pound packet, which was deficient to the extent of three drachms 23 grains.

Mr. Bodkin, for the defendants, said that unless there was some written or printed representation applying to the article purchased, there could be no false trade description within the meaning of the Statue. In this ease the wrapper of the packet bore the words: "Ceylon and Indian Teas, 1s 6d per pound," and gave no indication whatever of the weight of the article sold. The Bench held that the wrapper gave an indirect indication, and imposed a fine of £5 and costs.

BOUNTY TEA TRADING.

A copy of a resolution, passed by the Birmingham Grocers' Association having been forwarded to Mr. Chamberlain, asking him to use his influence with the Home Office to put a stop to the lotteries in eonnection with what is known as the bonus tea trading system, the following reply has been received:

Highbury, Moor Green, Birmingham, Aug. 25, 1899.

Sir,—I am desired by Mr. Chamberlain to acknowledge the receipt of your letter of the 24th inst. and copy of resolution adopted by the Birmingham Grocers' Protection Association on the subject of bounty tea trading. At first sight Mr. Chamberlain imagines that the proper course would be to institute private prosecution under the Lotteries Act. He does not think that the Home Office has any power to undertake prosecutions in the name of the Government. He will, however, keep your request under consideration.—I am, sir, yours obediently,

J. WILSON.

PRODUCE AND PLANTING.

Tea Trade of Japan.—The tea trade of Japan is not in a very flourishing condition. The action of the United States Government in imposing a duty of 10c. gold a lb from June 14 on all tea imported had a marked effect upon the Japan tea season of 1898. The new Restriction Act, prohibiting the importation into the United States of inferior teas, continues to be strictly enforced, and many cases of rejection occurred during the year. Common teas have, therefore, for the most part been forced to seek a market in Canada, which has so far imposed no restrictions upon its admittance, but where, to judge from recent discussion in the Canadian Houses of Parliament, it appears by no means unlikely that similar precautionary measures will be taken for the exclusion of inferior teas. The total export of tea from Japan to Canada amounted to 11,512,145 lb, as compared with 8,605,492 lb during a corresponding period of the year before, an increase of 2,906,653 lb. In the United States tea costs 40c. gold per lb, with the new duty of 10c. gold per lb, and the beverage is therefore at a great disadvantage as compared with coffee. General depression of business followed the announcement of the enforcement of the duty, and in serveral cases large orders were cancelled. Most of the tea shipped to America has remained in bond owing to the lower price of that which reached the country prior to June 14. As nearly all last season's tea remains unsold, it does not look as if the season of 1899 would be a prosperous one. In Japan, moreover, the cost of tea-firing materials and labour has continued to increase, as compared with former years, and, strange to say, since the imposition of the new duty the prices asked for by the growers have likewise risen. The total export for 1898 amounted to 41,102,118 lb, valued at £838,740, as compared with 43,510,244 lb, valued at £798 327, in 1897. Of this quantity 31,861,149 lb. went to the United States of America, 7,680,644 lb. to Canada, and the remainder to various other countries, of which China with 501,660 lb, took the largest proportion.

Her Majesty's Customs and Produce.—In the annual report of the Customs Department just issued there is a table which analyses the items in our dutiable imports for the ten years 1889-98, showing the increase or decrease in each year of the quantities imported for home consumption. The most notable increase is to be found, under the head of Cocoa, which recorded a growth, between 1896 and 1897, of no less than 32·7 per cent., the total figures being 28,270,562 lb. in 1896 and 37,528,246 lb, in 1897. If the fiscal years 1996-97 and 2897-98 be taken, and the comparison confined to manufactured cocoa, an even greater proportional advance is observed—viz., 80·4 per cent. We are glad to see, however, that the home manufacturer's competitive instincts have awakened, with the result that in the last fiscal year imported manufactured cocoa went down from 8,029,151 lb. to 6 366,120 lb.—a decrease of 1,663,031 lb.; while the imports of raw cocoa rose from 30,087,311 lb. to 34,634,962 lb.—an increase of 4,547,651 lb. Going back to the table of calendar years, we find that between 1889 and 1898 the import of cocoa (both raw and manufactured) increased from 20,541,254 lb. to 40,192,049 lb.—that is, nearly doubled itself: a testimony at once to the growing favour of the beverage and to the fact that the "masses" are taking their share in the national taxation. These facts are further exemplified in the case of tea, the consumption of which grew from 185,578,298 lb. in 1889 to 235,353,767 lb. in 1898—an increase of

nearly 26·8 per cent. This increase is attributable also, in part, to reductions in duty and price; but it is noteworthy that with rising prices there was in 1898 an increase of 1·7 per cent. over the 1897 imports.

Coffee Production.—From figures compiled by Messrs. During and Zoon, of Rotterdam, some idea of the importance of Brazil as a factor in the coffee supply may be gathered. Since 1895, when 13,283,800 bags coffee were produced in all the countries of the world, the aggregate yield has considerably varied, sinking to 11,729,500 bags in the following year, increasing to 15,000,000 bags in 1897, and afterwards expanding to about 17,745,000 bags in 1898. This seems to have been the heaviest quantity ever raised in a single year. At the end of 1893 the aggregate quantity of coffee on hand, so far as it could be ascertained, was only 1,585,000 bags; whereas at the close of last year it embraced 4,734,000 bags, or about treble the former amount, and this great excess has been looked upon as a very serious matter for the importers.

The Outlook.—First, says the *Grocer*, excessive stocks must be worked off; next, supplies must visibly decrease; and thirdly, to strengthen the position all round, the consumption of coffee must steadily progress onwards without a break. With these conditions fulfilled, importers and growers may have the satisfaction of seeing their hopes of higher rates realised.

Assam Rubber Trees for the Soudan.—According to a report of Sir William Garstin, K.C.M.G., to the Foreign Office, there is a good prospect of the Soudan becoming a rubber country. There is, of course, an increasing demand for india rubber owing to its electrical and vehicular uses, while the natural supply is diminishing. It must, therefore, be cultivated, and it is believed that the rubber tree of Assam would flourish in most of the Soudan, especially south of Khartoum.

Big Figures.—It is pointed out by a correspondent that the Chancellor of the Exchequer in his Budget speech on April 13th seems to have understand the revenue brought in during the past financial year by the tea duty. According to the annual report of the Commissioners of Customs the amount of the increase was not £62,000, as Sir M. Hicks-Beach is reported to have said, but £155,297. Altogether £4,023,503 was realised in the shape of tea duty, which appears to be the largest yearly sum received since Mr. Goschen in 1890 reduced the duty from sixpence to fourpence. In weight the tea on which duty was paid exceeded 240,000,000lb—9,318,000lb more than in the previous twelve months. The whole of this amount, however, must not be credited to the year's consumption. As the Commissioners point out, just before March 31st, when the year ended, a big cheque was handed in at the Custom House, this large payment obviously covering tea which we are now consuming. Still, after allowance is made for this there was an advance in the clearance of about 3,000,000lb.

Indian Tea Companies.—The list of Indian tea companies registered in England, giving the acreage, capital, secretaries or agents, offices, directors and agents, compiled by Mr. George Seton, has been revised and brought up to date. From this it will be seen that the seventy-six companies have an acreage of 238,440 acres, and a capital of £9,578,440.—*H. and C. Mail*, Sept. 1.

"SIROCCO" MACHINERY.

A new and delicately-bound catalogue of tea machinery, issued from the well-known Belfast "Sirocco" Works, serves to confirm the recent reports that the presiding genius of that establishment, Mr. S. C. Davidson, has recently made some new and interesting discoveries in a wider field of engineering science than that with which he has hitherto been associated. While true to his early love, the tea industry, he claims to have attained results in his experiments with air forces which are calculated both to extend the scope of his operations as a successful engineer and enhance his reputation as an original thinker, who, untrammelled by usually accepted theories, boldly strikes out a course for himself, and offers to the sceptical striking proofs of the success of his achievements. The catalogue we have just received is therefore of more than ordinary interest, in that it describes and illustrates the results arrived at by this new departure in the

CONSTRUCTION OF CENTRIFUGAL FANS.

Before referring to that portion of it devoted to Fans, we will glance briefly at the machinery in the order in which it is found, the first place being given to tea machinery, which Mr. Davidson supplies for "every process in the manufacture of the leaf," the description of which, accompanied by suitable illustrations, is full and explicit on all points, including approximate dimensions and cost.

We have on previous occasions described the "Sirocco' tea machinery in detail, so that it is unnecessary to do more than chronicle their order in the list before us. First we have a useful machine known as a Leaf-Conveyor or Elevator. This, it is pointed out, is a convenient and expeditious machine for the conveyance of the tea-leaf from one part of the factory to another. Next we come to the

TEA LEAF WITHERING MACHINE,

which is now reported as doing its work in a remarkably short time, irrespective of atmospheric or other conditions, the leaf when thus withered producing, it is mentioned, a stronger liquoring tea than that obtainable by natural withering. The machine, we understand, is capable of keeping two rollers going, and is driven by a new and ingenious engine which proved quite a success. The "Sirocco" Rolling Machine, which comes next in the catalogue, is of the type which works without a top pressure cap, and it is claimed to be "up to date" in every respect. The Roll Breaker, Cooler, and Sorter, it is stated, carries out the operation of sorting and cooling freshly-rolled leaf, breaking at the same time any lumps and balls there may be in the tea. Then come full descriptions of the tea-drying machines—first, the Auto-Sirocco Tea Drier, which automatically subjects the wet leaf at the start to a high temperature, which immediately checks fermentation on the leaf entering the machine, and then finishes off the drying at low temperatures.

There is the well-known

DOWNDRAFT "SIROCCO"

with Multitubular Air Heater, and also with Cast-iron Vertical Flue Air Heater; and the various types of Self-acting Updraft "Siroccos," with their varieties of Side-drawer and Endslide tray arrangements, and fitted with similar Air Heaters. Following these, are illustrations of the new patent metal trays for "Sirocco" Driers; while a further section of the catalogue is devoted to Tea Sorters and Cutters, and the Davidson-McGuire Tea Packer, all of which are well known and do not need further description.

There is, too, a Tea Pellet Compressing Machine for dealing with tea dust, which is simple in construction, and converts the tea dust to pellet form, thus enhancing its value in the market.

While these machines, the use of which is confined to tea gardens and factories, have until recently formed the chief output of the Sirocco Works, Mr. Davidson has, as we have stated, been occupied of late in sloving other problems in the domain of engineering, and he now claims to have brought about a revolution in the construction and manufacture of Fans, a new departure, which has not only astonished engineers, but has rendered an early enlargement of his Belfast

works a necessity. Apart from their use as adjuncts of tea machinery there is a great demand for

"SIROCCO" FANS

in nearly every department of the industrial world. The illustrations of these Fans are accompanied by particulars of surprising trial tests. The leading features of this new departure are concisely described in the catalouge before us by the following comparison between the centrifugal fans at present familiar to us and Davidson's patent. Under the former we find as the hitherto accepted data for best construction :

"Blades.—Comparatively few ; radially deep ; outer edges short axially, and either straight or curved backwards from direction of rotation ; ends unclosed their full depth, from the outer to the inner edges ; and the inlet opening for admitting the air to the centre of the fan approximately one-half of the fan diameter ; it having been accepted as an axiom that a small inlet (although detrimental to volume) was necessary for pressure."

In the "Sirocco" Fans, the construction above referred to is practically reversed on every point, viz :—

"Blades.—Very numerous ; radially very shallow ; outer edges long axially, and curved forward in the direction of rotation ; ends open towards the inflowing air, from the outer to the inner edges ; and the inlet opening for admitting the air to the fan, of approximately equal diameter to that of the fan itself, whereby in the "Sirocco" fan maximum volume is combined with maximum pressure, which combination has not been obtained in any other fan hitherto made."

Mr. Davidson has thus evidently inaugurated a new and important change in the entire principle of construction of fan blades, and also as regards the inlet opening for the air, which in the "Sirocco" fan is about four times larger in area (relatively to the diameter of the fan) than in centrifugal fans as generally made ; whereby the frictional resistance to the inflow of a given volume of air is only a sixteenth of what it is in other centrifugal fans. With his usual objection to half measures and premature disclosures of experimental work, Mr. Davidson, before making full announcement of his revolutionary discoveries in connection with the operative principles pertaining to fan construction, satisfied himself in the most thorough way as to the results. The catalogue before us contains data on the subject of "Sirocco" versus other centrifugal and propeller fans which testify not only to the thought and labour necessary in the process of evolving practical issues from theory, but demonstrate the remarkable success achieved. One result not mentioned in the catalogue is that Mr. Davidson has

SUCCESSFULLY VENTILATED

several of the Courts in the Royal Courts of Justice, and has lately received the order to similarly ventilate a further number of them. Many other systems for the ventilation of these Courts have been tried and found wanting, and Mr. Davidson's success is in itself a convincing proof of the efficiency of his new fans.

It is not to be wondered, therefore, that

"A PHENOMENAL DEMAND"

has already arisen for "Sirocco" Fans, and that the Patentee is making arrangements on an extensive scale to meet this demand. We wish every success to his new invention, which seems destined in the wide field of engineering to which it applies to rapidly develop into a more extensive business than his now large and highly successful business in Tea machinery ; but we at the same time hope that this development may not involve a lessening of his interest in, or withdrawal of his inventive abilities from, the further development of machinery for Tea manufacture, which would be a serious loss to the Tea Planting industry.—*H. & C. Mail,* Sept. 1.

CEYLON TEA IN GERMANY.

THE YEAR AT HAMBURG.

Business in tea at Hamburg was limited, last year to about the same extent as in 1897. It is considered that the mild autumn and winter of last year were unfavourable to the increase of tea consumption in Germany and Austria. The importations of Indian and Ceylon teas were, however, in excess of those during 1897, and the consumption of these sorts appears to be developing, though slowly, in Germany. It is thought that the present efforts towards exploiting and developing the resources of China are likely to lead to the resuscitaton, by European assistance, of the cultivation and export trade of Chinese teas at a near date.—*Planter,* Sept. 16.

The Shipment of Tea-Chests.—The Captain of the "Clan Macdonald" makes a small, but very useful appeal to planters to mark as "top" one of the non-morticed sides of their tea-chests—a practice which Messrs. Freudenberg are in the habit of doing. If this were done in the factory there would be a trifle less of the "loss in transhipment" which the draft-allowance is still held to account for in part.

The Pearl Fisheries of the Dutch East Indies.—A report by the United States consular agent at Macassar, in the Celebes, on the pearl fisheries in the Dutch possessions in the Eastern Archipelago, has been issued by the Department of State in Washington. The shells of the pearl oyster form one of the most important exports from Macassar ; and, up to the beginning of the present decade, they were sought almost exclusively by natives who fished in the shallow water of the bays without using a diving apparatus. In 1893 a London company sent a schooner, with some luggers to the Aru Islands to try fishing in deep waetrs ; but the little fleet was compelled to leave the Archipelago in consequence of a law that only vessels under the Dutch flag, owned by Dutch subjects or companies, should be allowed to engage in pearl fishing. Residents in the Eastern Archipelago now began to give more attention to the fisheries, and Europeans, Chinese, and Arabs made arrangements with native chiefs in whose waters shells were supposed to be, by which a rent or royalty was paid for the right to fish. At present fishing is prosecuted on the east coast of the Aru Islands, on the east of New Guinea, off Celebes and Timor. The chief market for the shells is Paris, London and other Continental cities taking but small quantities. Two hundred and fifty tons were exported from the Dutch East Indies in 1897, and the quantity is increasing. Aru shells sell at £140 a ton, those from New Guinea, Timor, and Celebes fetching from £80 to £100 a ton. The regulations permit of fishing all the year round, but, in fact, the monsoons prevent this. Natives of the Philippines are mostly employed on the work as they are better than those of the islands close to the fisheries. A cheaper kind of shell is also fished largely, and is sent to Germany and England where it is used in the manufacture of buttons.—London *Times,* Aug. 29.

Ceylon Rainfall.

The P. W. D. Meteorological Observations for Aug 1899.—We append this Monthly Return of rain from which it will be seen that the highest fall was at Padupola in the Central Province, 21·20 inches, and the lowest at Maha Uswewa tank, in the North-Western Province 0·07 inches.

Western Province.

Negombo, Mr. Bneknall (6) ... 0·08
Kalutara Mr Buu'tjens (36) 1·37
Labugama, Mr. Bond (369) ... 6·50
Henaratgoda, Mr. Silva (33) ... 0·96

Central Province.

Katugastota, Mr. Morgan (1,600) .. 2·37
New Valley, (Dikoya) Mr. Ward (3,708) .. 11 63
Helboda, (Pussellawa) Not reeeived (3,300) ... —
Yarrow Estate, ... Mr. Peto (3,400)... 11·43
Peradeniya Mr. ... MacMillan (1,540) ... 3 50
Duckwari, Mr. Edwin (3,300) ... 4·55
Caledonia, Mr Goork .. (4,273) ... 7·03
Pussellawa, Mr. .. Powell (3,000) .. 7·50
Hakgala, Mr. .. Neck (5,581) .. 2·88
S. Wanarajah Estate, Mr. Tatham (3,700) ... 13·98
St. Andrew's (Maskeliya,) Not reeeived (4,200)... —
Padupola, Mr. Ward ... (1,635) .. 21 20
Mylapitiya, Mr. Fletcher (1,707) ... Nil

Northern Province.

Mullaittivu, Mr. Sanmukam (12) . 1·89
Jaffna Mr MacDonnell (8) Nil
Mankulam, (N. Road) Mr. Walker (167) .. Nil
Elephant Pass, Mr. .. Silva (7) .. Nil
Vangalachettykulam, Mr. Oorloff (179) ... Nil
Point Pedro, Mr. Pararaehasinghe (24) .. Nil
Jaffna College, Mr. Cooke (9) ... Nil
Kayts, Mr. Kretser (8) .. Nil
Kankesanturai, Mr. ... Adams (10) . Nil
Pallai, Mr. Silva (24) .. Nil
Murikandy, (North-Central Road) Mr. Silva — Nil
Nedunkeni, Mr. Sanmukam (122) ... 0·30
Chavakachcheri, Mr. Silva (16) ... Nil
Udupiddi, Mr. Hastings (35) ... Nil
Marichchukaddi, (14) Mr. Thamotharampillay Nil
Murungan, Mr. Bechingberg (52) Nil
Vavuniya Mr. Walker (318) Nil

Southern Province.

Ella Vella (262) Mr. Smith 7·32
Kekauadura, (150) do 1·03
Denagama, (286) do 7·34
Udukiriwila Mr. Lourensz (235) ... 1·85
Kirama, Mr. Ismail (260) 0·27
Hali-ela (200) Mr. Smith 5·80
Tissamaharama, Not received (75) ... —
Matara (15) Mr. Smith 3·68
Dandeniya, (157) do 5·70
Urubokka, (890) do 7·02
Elagala, Not reeeived (121) —
Tangalla, (94) Not received ... —
Mamadola, Mr. Cade — (56) ... 1·48

Eastern Province.

Irrakkamam, (42) Not received —
Devilana, Mr. Vanderstraaten (136) Nil
Sagamata, Not reeeived (40) ... —
Ambare, do (65) —
Kanthalai, Mr. Carte (150) Nil
Allai, Mr. Carte (95) 5·25
Rukam, Mr. Vanderstraaten (120) .. Nil
Periyakulam, Mr. Carte (20) ... 4·42
Chadaiyantalawa, Mr. Edge (57) ... 0·22
Kalmunai, do (12) Nil
Rotewewa, do (30) 0·38
Lahugala, do (70) 0 81
Naulla, do (30) 0·10
Andankulam, Mr. Carte (41) ... 3·35
Manalpuddy, Mr. Vanderstraaten (21) Nil
Maha-Oya-Tank, Mr. Vanderstraaten (190) 5·17

N.-W. Province.

Magalawewa, Not received (176) .. —
Maha Uswewa tank, Mr. Crabb (160) ... 0·07
Tenepitiya, Mr. Churchill (8) ... Nil
Batalagoda, Mr. Fonseka — 0·53

N.-C. Province.

Kalawewa, (268) Mr. Carson Nil
Maradankadawala, Mr. Carson (443) ... Nil
Mihintale, Mr MacBride (354) ... Nil
Horowapotana, Mr. MacBride (217) ... Nil
Madawachchiya, Mr. MacBride (285) ... Nil
Topare, (200) Mr. Jayewardane ... Nil
Minneriya — Mr. Eves Nil

Uva Province.

Bandarawela, Mr. Toeke (4,000) ... 1·00
Haldummulla, Mr. Viramuttu (3,160) ... Nil
Kumbukan, (446) Mr. Emerson ... 0·55
Koslanda, (2,258) Mr. Emerson ... 0·72
Tanamalwila, Not received (550) ... —

Sabaragamuwa.

Ambanpitiya, Mr. Caldicott (729) 7·29
Pelmadulla, Mr. Clarke (408) 7·50
Kolonna Korale (Hulanda-oya) (203) Not received —
Avisawella, Mr. Jeffery (105) 5·08

RATWATTA COCOA CO., LIMITED.

REPORT.

The Directors beg to snbmit their report and statement of accounts for the season ended 30th June, 1899.

The shareholders were duly advised that for convenience of working it had been decided to extend the season to 30th June so as to secure all the cocoa crop; and the agricultnral year from now onwards will date from 1st July to 30th June.

The season has been one of growth and development, and a first crop from the oldest cocoa field has been harvested.

The cocoa crop from the 1893 clearing (72a. 1r. 23p.) turned out 172 cwt. 1 qr. 11 lb., or say 2⅓ cwt. per acre. This was sold in the country at an average of abont R43 60 per cwt. The estimate of 300 cwt., justified by the profuse blossoms, has not unfortunately been realized. The trees, it is thought, are too young yet to mature more than a small percentage of the blossoms, and that percentage is very difficult to gauge.

The Tea crop, including 23,395 lb. bonght leaf, tnrned out 60,601 lb., which is calculated to be about 460 lb. per acre from the acreage plucked. This sold at an average of a little over 33½ cents.

On the 18 months' working there is a profit from the crop-bearing portion of the Estate of R5,738 23; bnt, on the other hand, there has been a further outlay of R20,203.74 on Buildings and Machinery and fields not in bearing, inclnding a new clearing referred to below.

During the season under review 75 acres of forest were cleared and planted with Tea, the most suitable portions being also planted with Cocoa.

The young Tea clearings are not so far advanced as they should have been, owing to a conflict with weeds and the plants having been somewhat immature. These faults, however, are now less apparent, and good progress may be expected during the curreut season.

A survey of the whole property has been made by a competent Surveyor, and his plan is now in the hands of the Surveyor-Geueral for examiuation and verification.

The following is a definition of the Company's property as at 30th Jnne :—

		A.	R.	P.			
Cocoa planted 1893	...	72	1	23			
Do do 1894	..	85	0	29			
Do do 1895	...	65	2	07			
					223	0	1
Tea planted 1890 (and cocoa)	...	118	3	27			
Do do 1896 do	...	24	0	00			
Do do 1897 do	..	99	3	27			
Do do 1898 do	..	75	0	00			
					317	3	
Grass	..				3	0	00
Total cultivated	..				543	3	33
Jungle	..				181	0	00
Total acreage	..				724	3	33

Mr. Huxley visited the estate in July along with Mr. Pyper, the Managing Director, and both are satisfied with the prospects. There was no disease of any kind visible either on Cocoa or Tea, and it only wants time now for the land to come into bearing to secure profits.

Next year's crops are estimated at 300 cwt. Cocoa and 50,000 lb. of Tea, together with 16,000 lb of Tea from outside leaf. The estimate of expenditure has not yet been finally passed by the Directors, but they will be in a position to give information regarding the same at the meeting.

It will be seen by the Balance Sheet that the Capital and Mortgage money is now practically all expended on property and Coast Advances; and, as there is not likely to be a snfficient surplus on current season's Revenue acconnt, arrangements will have to be made to meet present liabilities and any further capital outlay.

Mr. Gordon Pyper having been appointed Managing Director for a term of years, Mr. Edmund Jeffries only retires from the Directorate by rotation, but he is eligible for re-election.

SHARE LIST.

ISSUED BY THE

COLOMBO SHARE BROKERS' ASSOCIATION.

CEYLON PRODUCE COMPANIES.

Name of Company.	Amount paid per share.	Buyers.	Sellers
Agra Ouvah Estates Co., Ltd.	500	875	900
Ceylon Tea and Coconut Estates	500	—	500 n'l
Castlereagh Tea Co., Ltd.	100	90*	—
Ceylon Hills Estates Co., Ltd.	100	—	30
Ceylon Provincial Estates Co.	500	485	500
Claremont Estates Co., Ltd.	100	15	..
Clunes Tea Co., Ltd.	100	—	90*
Clyde Estates Co., Ltd.	100	—	90
Delgolla Estates Co., Ltd.	400	--	140*
Doomoo Tea Co., of Ceylon, Ltd.	100	—	60*
Drayton Estate Co., Ltd.	100	135	—
Ella Tea Co., of Ceylon, Ltd.	100	55*	60
Estates Co., of Uva, Ltd.	500	—	350
Gangawatta	500	—	—
Glasgow Estate Co., Ltd.	500	—	900
Great Western Tea Co., of Ceylon, Ltd.	500	640	—
Hapugahalande Tea Estate Co Ltd	200	—	250
High Forests Estates Co Ltd	500	—	550
Do part paid	350	375	...
Horekelly Estates Co., Ltd.	100	80	—
Kalutara Co., Ltd.	500	—	390
Kandyan Hills Co Ltd.	100	50	—
Kanapediwatte Ltd.	100	—	85
Kelani Tea Garden Co., Ltd.	100	...	65
Kirklees Estates Co., Ltd.	100	—	142·50
Knavesmire Estates Co., Ltd.	100	..	75
Maha Uva Estates Co., Ltd	500	—	575
Mocha Tea Co., of Ceylon, Ltd.	500	—	625
Nahavilla Estate Co., Ltd.	500	—	500
Nyassaland Coffee Co. Ltd.	100	..	90
Ottery Estate Co., Ltd.	100	116	150
Palmerston Tea Co., Ltd.	500	..	415
Penrhos Estates Co., Ltd.	100	95	97·50
Pine Hill Estate Co., Ltd.	60	—	60
Pitakanda Tea Company	500	1,000	—
Putupaula Tea Co., Ltd.	100	..	100
Ratwatte Cocoa Co., Ltd.	500	—	500 n'l
Rayigam Tea Co., Ltd.	100	62·50*	62·50
Roeberry Tea Co., Ltd.	100	—	50
Ruanwella Tea Co., Ltd.	100	...	75
St. Heliers Tea Co., Ltd.	5 0	500	—
Talgaswela Tea Co., Ltd.	100	—	35
Do 7 per cent. Prefs.	100	80	..
Tonacombe Estate Co., Ltd.	500	—	450
Udabage Estate Co., Ltd.	100	..	40
Udugama Tea & Timber Co., Ltd.	50	..	10 n'l
Union Estate Co., Ltd.	500	—	300
Upper Maskeliya Estate Co., Ltd.	500	..	500
Uvakellie Tea Co., of Ceylon, Ltd.	100	65	70
Vogan Tea Co., Ltd.	100	85	90
Wanarajah Tea Co., Ltd.	500	—	1145
Yataderiya Tea Co., Ltd.	100	350*	375

Ceylon Commercial Companies.

Name of Company.	Amount paid per share.	Buyers.	Sellers
Adam's Peak Hotel Co., Ltd.	100	..	60
Bristol Hotel Co., Ltd.	100	90*	92·50
Do 7 per cent Debts.	100	102·50	.—
Ceylon Gen. Steam Navgt. Co., Ltd.	100	—	210
Colombo Apothecaries Co., Ltd	100	140*	—
Colombo Assembly Rooms Co., Ltd.	20	..	12·50
Do prefs.	20	..	17
Colombo Fort Land and Building Co., Ltd.	100	85*	..
Colombo Hotels Company	100	—	300*
Galle Face Hotel Co., Ltd.	100	..	150*
Kandy Hotels Co., Ltd.	100	95*	—
Kandy Stations Hotels Co.	100	..	35
Mount Lavinia Hotels Co., Ltd.	500	—	400
New Colombo Ice Co., Ltd.	100	170*	—
Nuwara Eliya Hotels Co., Ltd.	100	—	25*
Public Hall Co., Ltd.	20	15	—
Petroleum Storage Co.	100	—	—
Do 10 % prefs.	100	35	40

*Transactions

LONDON COMPANIES.

Name of Company.	Amount paid per share.	Buyers.	Sellers.
Alliance Tea Co., of Ceylon, Ltd.	10	8½—9	—
Associated Estates Co., of Ceylon Ltd.	10	..	6—7
Do. 6 per cent prefs.	10	..	9—9½
Ceylon Proprietary Co.	1	..	12·6—17·6
Ceylon Tea Plantation Co., Ltd.	10	..	26½—27
Dimbula Valley Co., Ltd.	5	—	5½—6
Do prefs.	5	—	5½—6
Eastern Produce and Estates Co., Ltd.	5	..	6—6½
Ederapolla Tea Co., Ltd.	10	.	8—9
Imperial Tea Estates Ltd.	10	..	5—6
Kelani Valley Tea Asson., Ltd.	5	..	5—6
Kintyre Estates Co, Ltd.	10		6—8
Lanka Plantation Co., Ltd.	10	4½	5—6
Nahalma Estates Co., Ltd.	1	.	½—1
New Dimbula Co., Ltd.	1	..	2½—2¾
Nuwara Eliya Tea Est. Co., Ltd	10	..	9¾
Ouvah Coffee Co., Ltd.	10	7	7*
Ragalla Tea Estates Co., Ltd.	10	...	9—11
Scottish Ceylon Tea Co., Ltd.	10	..	14—16
Spring Valley Tea Co., Ltd.	10	..	5—6
Standard Tea Co., Ltd	10	.	12—13
Yatiyantota Ceylon Tea Co., Ltd	10	...	8—9
Yatiyantota pref. 6 o/o	10	..	10—10½

BY ORDER OF THE COMMITTEE.

Colombo, 29th September, 1899.

RAINFALL RETURN FOR COLOMBO

(Supplied by the Surveyor-General.)

	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897	1898	Av of 29yrs.	1899
	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch	Inch	Inch	Inch.	Inch.
January ..	0·81	1·45	7·39	5·42	0·62	5·00	2·92	3·81	2·32	3·09	6·98
February ..	4·36	2·81	5·32	2·36	0·52	0·81	0·35	1·68	1·98	1·90	2·78
March ..	5·34	9·43	1·52	5·15	7·44	1·84	5·64	3·66	4·21	4·92	0·88
April ..	14·27	5.93	13·92	20·39	12·51	9·34	5·93	10·97	22·81	11·47	6·66
May ..	6·48	17·65	3·00	10·32	3·00	10·09	9·31	8·30	5·80	11·89	17·73
June ..	1·87	9.79	6·62	11·01	11·32	13·99	8·37	10·14	10·94	8·34	9·23
July ..	3·32	4·59	1·10	2·20	1·72	0·52	2·85	5·24	6·15	4·49	1·11
August ..	0·73	1·65	1·86	1·01	0·86	0·92	6·35	9·09	0·97	3·77	0·62
September	1·50	4·42	1·14	1 99	0·78	4·09	10·99	4·58	6·90	5·13	1·48*
October ..	13·33	35·28	12·24	5·59	20·81	30·36	16·78	4·71	20·60	14·57	
November..	12·32	18·37	5·86	18·10	14·63	5·83	19.81	11·66	17·38	12·80	
December..	8·47	7·66	0·86	·13	3·25	9·44	11·76	8·89	3 05	6·45	
Total..	72·80	119·03	60·83	89·67	77·46	92·23	101·06	82·73	103·11	88·82	47·47

* From 1st to 27th Sept. 1·48 inch, that is up to 9·30 a.m. 28th Sept.—Ed. *C.O.*

Indian Tea Prospects.—The prospects of the Indian tea industry. the Calcutta correspondent of the Allahabad *Pioneer* reports, continue to brighten very considerably. With the dispute in London brought to a favourable termination, with values in Calcutta distinctly improving, a better demand from the outside markets, and better weather in most of the districts which will afford a chance of desirable quality being soon available, the hopes of those interested in tea are on a higher level than of late, when the outlook was decidedly gloomy. The weather in the tea districts has been generally favourable, except in North Assam, where it has been too cold,

COLOMBO PRICE CURRENT.

(Furnished by the Chamber of Commerce.)

Colombo 26th Sept, 1899

EXCHANGE ON LONDON :—Closing Rates : *Bank Selling Rates*:—On demand 1/4 3-32 ; 4 months' sight 1/4⅛ to 5-32 ; 6 months' sight 1/4 5-32. *Bank Buying Rates*:—Credits 3 months' sight 1/4 ⅜ ; 6 months' sight 1/4 ½ ; Docts 3 months' sight 1/4 7-16 ; 6 months' sight 1/4 9-16.

Indian Bank Minimum Rates 5 o/o to 6 %

Local Rates : 2 o/o Higher.

COFFEE :—

Plantation Estate Parchment on the spot per bus—R12.00

Plantation Estate Coffee, f.o.b on the spot per cwt R72.50

Liberian Parchment on the spot per bus—None.

Native Coffee f.o.b per cwt. R38.00

TEA:—Average Prices ruling during the week—Broken Pekoe per lb. 46c. Pekoe per lb. 38c. Pekoe Souchong per lb. 34c. Broken Mixed and Dust per lb. 29c.—Averages of Week's sale.

CINCHONA BARK:—Per unit of Sulphate of Quinine per lb 7c.

CARDAMOMS:—Per lb R1.80

COCONUT OIL:—Mill oil per cwt. None.

Dealers' oil per cwt. R13.75 ; Coconut oil in ordinary packages f.o.b. per ton R307.50

COPRA:—Per candy of 560 lb. R42. 50

COCONUT CAKE:—(Poonac) f.o.b. per ton, R85.00

Cocoa unpicked & undried, per cwt. R42.00

Picked & Dried f. o. b. per cwt. R48.50

COIR YARN.—Nos. 1 to 8 { Kogalla R17.25 / Colombo R16.00

CINNAMON :—Nos. 1 & 2 only f.o.b. 62c.

Do Ordinary Assortment. per lb 56½c.

EBONY.—Per ton None.

PLUMBAGO :—Large Lumps per ton, R1,100

Ordinary Lumps per ton, R1,000

Chips per ton, R700 ; Dust per ton, R600 ; Dust Flying R200.—

RICE.—Soolai per bag, R8.25 to 8.87

,, per bushel, R3.15 to 3.52

Pegu & Calcutta Calunda per bushel. R3.25 to 3.35

Coast Calunda per bushel, R3.30 to R3 40

Mutusamba per bushel R3.50 to 3.75

Kadapa and Kuruwe, per bushel } None.

Rangoon, raw 3 bushel bag. }

Soolai Kara per bushel R3.08 to 3.15

Coast Kara per bushel R3.20 to 3.25

THE LOCAL MARKET.

(By Mr. James Gibson, Baillie St., Fort.)

Colombo, Sept 26th, 1899.

COFFEE :—

Estate Parchment :—per bushel		Nil.
Chetty do	do	Nil.
Native Coffee } per cwt.		Nil.
do F. O. B } per cwt.		Nil.
Liberian coffee:—per bushel		R3·50
do cleaned coffee:—per cwt		R22·50
Cocoa unpicked:—per cwt		R40·00 to 46·00
do cleaned	do	R42·00 to 48·00
Cardamoms Malabar per lb		R1·00 to 1·10
do Mysore	do	R1·65 to 2·00
RICE :—		
Soolai per bag of 164 lb. nett		R8·50 to 8·87
Slate or 1st quality:—per bushel		R3·25 to 3·30
Soolai 2 & 3rd. do do	do	R3·15 to 3·25
Coast Calunda		R3·30 to 3·40
Coast Kara		R3·20 to 3·25
Kazala		R3·08 to 3·12
Muttusamba Ordinary		R3·50 to 3·75
Cinnamon. per lb No 1 to 4		R00·57
do do 1 to 2		R00·65
do Chips per candy		R92 50 to 95·00
Coconuts Ordinary per thousand		R35·50 to 38·00
do Selected	do	R36·00 to 39·00
Coconut Oil per cwt		R13·62½ to 13·75
do do F. O. B. per ton		R272·50 to 275·00
POONAC :—		
Gingelly per ton		90·00 to 92·50
Coconut Chekku	do	R75·00 to 77·50
do Mill (retail)	do	R75·00 to 80·00
Cotton Seed	do	R75·00 to 80·00
Copra per candy		
OONAC :—		
Kalpitiya	do	R42·50
Marawila	do	R42·00
Cart Copra	do	R40·00 to 41·00
Satinwood per cubic feet.		R2·00 to 2·25
do Flowered	do	R5·00 to 6·00
Halmilla	do	R1·90
Palu	do	R1·00 to 1·12
Ebony per ton		R75·00 to 175·00
Kitul fibre per cwt		R30·00
Palmyra do	do	R8·00 to 17·50
Jaffna Black Clean per cwt		R14·00
do mixed	do	R11·50 to 12·50
Indian	do	R8·00 to 13·50
do Cleaned	do	R10·50 to 17·50
Sapanwood per ton		R50·00 to 55·00
Kerosine oil American per case		R6·00 to 6·25
do bulk Russian per tin		R2·75 to 3·00
do Russian per case		R5·60 to 5·90
Nux Vomica per cwt		R2·00 to 3·50
Croton Seed per cwt		R38·00 to 40·00
Kapok cleaned f o b do cwt		R24·00 to 25·00
do uncleaned do		R7·50 to 8·00
Plumbago per ton, according to grade	Large lumps	R700·00 to 1,100·00
	do	R550·00 to 1,050·00
	Chips	R300·00 to 700·00
	Dust	R150·00 to 600·00

CEYLON EXPORTS AND DISTRIBUTION 1899.

COUNTRIES.	Tea. 1899 lbs.	Tea. 1898 lbs.	Coffee—cwt. Plantation	Coffee—cwt. N'tive	Coffee—cwt. Total.	Cinchona Branch & Trunk lb. 1899. lbs.	Cinchona Branch & Trunk lb. 1898. lbs.	Cocoa cwts.	C,moms lbs.	Cinnamon. Bales lbs.	Cinnamon. Chips. lbs.	Coconut Oil. 1899 cwts.	Coconut Oil. 1898 cwts.
To U K. ..	74278984	72404989	12735	..	12735	430906	507021	32061	254468	734574	597627	112485	81793
,, Austria ..	7491	12633	1	..	1	..	..	...	...	..	105966	2064	8353
,, Belgium ...	12349	10540	90	..	90	..	4421	357	380	68260	95760	1602	903
,, France ..	74217	61419	165	...	165	33	22471	34	...	68354	1750	..	4209
,, Germany ..	278036	252529	125	..	125	..	..	22	21651	364905	422586	3739	8798
,, Holland ..	22874	22631	..	..	..	...	..	..	...	..	..	...	..
,, Italy ..	11761	3270	..	..	..	..	..	...	20	65800	111520	404	397
,, Russia ..	2719244	1634865	24	..	24	...	..	...	923	..	...	..	..
,, Spain ..	13800	27650	..	...	..	..	...	..	...	172400	37800	..	..
,, Sweden ..	42494	28450	..	..	..	..	..	...	4036	500	..	206	..
,, Turkey ..	15177	25839	1	..	1	..	...	..	336	...	..	..	..
,, India ..	413493	843152	120	..	120	..	..	1	38652	...	..	45288	92299
,, Australia ..	11966586	10960388	2878	..	2878	..	...	235	..	5400	20160	720	422
,, America ..	2206213	1816009	442	..	442	94005	186819	514	6240	100600	28000	72640	48247
,, Africa ..	221138	294448	...	..	..	..	724	..	2206	400	1240	...	19
,, China ..	935946	852173	28	...	28	...	2026	...	5951	45000	...	3184	2434
,, Singapore .	47232	46426	78	..	78	..	–	..	480	..	..	22333	82026
,, Mauritius ..	73701	7300	..	..	..	..	..	..	...	...	..	..	..
,, Malta .	192352	138219	..		..	...	..	..	..	..	..	..	...
Total export from 1st Jan. to 26th Sept. 1899	93473088	89442930	16687	–	16687	524944	723482	33224	335343	1627193	1422409	264665	329891

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis & Peat's Fortnightly Prices Current, London, August 23rd, 1899.

	QUALITY.	QUOTATIONS.
ALOES, Soccotrine cwt.	Fair to fine dry ...	44s a 100s
Zanzibar & Hepatic ,,	Common to good ..	11s a 75s
BEES' WAX, ,,		
Zanzibar & Bombay White ,,	Good to fine	£7 a £7 10s
Zanzibar & Bombay Yellow ,,	Fair ,,	£5 10s a £6 10s
Madagascar ,,	Dark to good palish	£6 a £6 12s 6d
CAMPHOR, China ,,	Fair average quality	125s
Japan ,,	,, ,, ,,	130s
CARDAMOMS, Malabar lb	Clipped, bold, bright, fine	2s 6d a 2s 9d
	Middling, stalky & lean	1s 7d a 2s
Ceylon.—Mysore ,,	Fair to fine plump ..	3s 8d a 3s 10d
	Seeds ..	1s 9d a 2s 5d
,, Tellicherry ,,	Good to fine ..	2s 11d a 3s
	Brownish .	2s 6d
,, Long ,,	Shelly to good ..	2s 6d a 3s 6d
,, Mangalore ,,	Med brown to good bold	2s 3d a 3s 3d
CASTOR OIL, Calcutta ,,	1sts and 2nds ..	3¼d a 4d
Madras ,,	..	3½d a 3¾d
CHILLIES, Zanzibar cwt.	Dull to fine bright ...	29s 6d a 40s
CINCHONA BARK.—		
Ceylon lb.	Crown, Renewed	5d a 7d
	Org. Stem	3⅜d
	Red Org. Stem	2¼d a 3½d
	Renewed	3⅜d
	Root	3½d
CINNAMON, Ceylon 1sts per lb.	Ordinary to fine quill	10d a 1s 6d
2nds	,, ,,	9½d a 1s 5d
3rds	,, ,,	9d a 1s 4d
4ths	,, ,,	7½d a 11½d
Chips	,, ,,	2d a 8¼d
CLOVES, Penang lb.	Dull to fine bright bold	4¼d a 1s
Amboyna ..	Dull to fine	4d a 5¼d
Zanzibar and Pemba	Good and fine bright	3¾d a 4½d
	Common dull to fair	3d a 3½d
Stems ..	Fair	2d
COCULUS INDICUS cwt.	Fair	8s
COFFEE		
Ceylon Plantation ,,	Bold to fine bold colory	104s a 120s
	Middling to fine mid .	93s a 102s
	Low mid. and low grown	81s a 92s 6d
	Smalls	35s a 75s
Native	Good ordinary	30s a 70s
Liberian ,,	Small to bold	25s a 35s
COCOA, Ceylon ,,	Bold to fine bold	82s 6d a 92s
	Medium and fair	65s a 77s 6d
	Triage to ordinary	4 's 6d a 62s 6d
COLOMBO ROOT ,,	Ordinary to good	14s a 21s
COIR ROPE, Ceylon ton		nominal
Cochin ,,	Ordinary to fair .	£14 a £23
FIBRE, Brush ,,	Ord. to fine long straight	£10 a £21
Cochin ,,	Ordinary to good clean	£18 a £22
Stuffing ,,	Common to fine	£7 a £9
COIR YARN, Ceylon ,,	Common to superior	£15 a £33
Cochin ,,	,, ,, very fine	£12 a £32
do. ,,	Roping, fair to good	£10 a £14 10s
CROTON SEEDS, sift. cwt.	Dull to fair	40s a 55s
CUTCH ,, ,,	Fair to fine dry	28s a 35s
GINGER, Bengal, rough ,,	Fair	21s
Calicut, Cut A ,,	Good to fine bold	69s 6d a 75s
B & C ,,	Small and medium	27s 6d a 50s
Cochin Rough ,,	Common to fine bold	20s a 26s
	Small and D's	17s a 19s 6d
Japan ,,	Unsplit	20s 6d
GUM AMMONIACUM ,,	Sm. blocky to fine clean	20s a 45s
ANIMI, Zanzibar ,,	Picked fine pale in sorts	£10 7s 6d a £15
	Part yellow and mixed	£8 2/6 a £10 10s
	Bean and Pea size ditto	70s a £9 2/6
	Amber and dk. red bold	£5 10s a £7 10s
	Med. & bold glassy sorts	80s a 100s
Madagascar ,,	Fair to good palish ...	£4 8s a £8
	,, ,, red ...	£4 5s a £9
ARABIC E. I. & Aden ,,	Ordinary to good pale	40s a 55s
Turkey sorts ,,		70s a 85s
Ghatti ,,	Pickings to fine pale ...	12s 6d a 35s
Kurrachee ,,	Good and fine pale ...	52s 6d a 55s
	Reddish to pale selected	30s a 40s
Madras ,,	Dark to fine pale ...	27s 6d a 35s
ASSAFŒTIDA ,,	Clean fr to gd. almonds	40s a 95s
	Ord. stony and blocky	24s a 47s 6d
KINO ,,	Fine bright	4s
MYRRH, picked ,,	Fair to fine pale	65s a 75s
Aden sorts ,,	Middling to good	33s a 55s
OLIBANUM, drop ,,	Good to fine white	35s 6d a 50s
	Middling to fair	25s a 35s
pickings ,,	Low to good pale	17s a 20s
siftings ,,	Slightly foul to fine	16s 6d a 18s
INDIARUBBER, Assam lb	Good to fine	2s 10½d a 3s 2d
	Common to foul & mxd.	1s 4d a 2s 6d
Rangoon	Fair to good clean ...	2s 9d a 3s 2d
	Common to fine	1s a 2s 4d

	QUALITY	QUOTATIONS.
INDIARUBBER, *(Contd).*		
Java, Sing. & Penang lb.	Foul to good clean ..	8d a 3s
Mozambique ,,	Good to fine Ball ..	2s 8d a 3s 5¼d
	Ordinary to fair Ball ..	2s a 2s 10d
	Low sandy Ball ..	1s 3d a 1s 6d
	Sausage, fair to good .	3s 2d a 3s 6d
	Liver and livery Ball	2s 4d a 3s 2d
Madagascar ,,	Fr to fine pinky & white	3s a 3s 4½d
	Fair to good black .	2s a 2s 3d
	Niggers, low to fine ..	1s a 2s 6d
INDIGO, E.I. ,,	Bengal—	
	Shipping mid to gd violet	2s 10d a 4s
	Consuming mid. to gd.	2s 6d a 2s 9d
	Ordinary to mid.	2s 2d a 2s 5d
	Mid. to good Kurpah	1s 11d a 2s 5d
	Low to ordinary	1s 8d a 1s 10d
	Mid. to good Madras	1s 4d a 2s 2d
MACE, Bombay & Penang per lb.	Pale reddish to fine	2s a 3s
	Ordinary to fair	1s 5d a 1s 11d
	Pickings	1s 1d a 1s 3d
MYRABOLANES, Madras cwt	Dark to fine pale UG	5s a 6s
	Fair Coast	5s 6d a 6s
Bombay ,,	Jubblepore	4s 3d a 7s
	Bhimlies	4s 9d a 9s 6d
	Rhajpore, &c.	4s 3d a 8s
Bengal ,,	Calcutta	4s 6d a 6s
NUTMEGS— lb.	64's to 57's	2s 4d a 2s 6d
Bombay & Penang ,,	110's to 65's	1s 1d a 2s 3d
	160's to 130's	6d a 11d
NUTS, ARECA cwt.	Ordinary to fair fresh	12s a 18s
NUX VOMICA, Bombay per cwt.	Ordinary to middling	4s a 5s 6d
Madras	Fair to good bold fresh	7s a 10s
	Small ordinary and fair	5s 6d
OIL OF ANISEED lb	Fair merchantable	6s a 6s 2d
CASSIA ,,	According to analysis	3s 11d a 5s 6d
LEMONGRASS ,,	Good flavour & colour	2¾d a 2⅞d
NUTMEG ,,	Dingy to white	3d a 3½d
CINNAMON ,,	Ordinary to fair sweet	3½d a 1s 6d
CITRONELLE ,,	Bright & good flavour	11d a 1s 1/0½d
ORCHELLA WEED—cwt		
Ceylon ,,	Mid. to fine not woody ..	10s a 12s 6d
Zanzibar. ,,	Picked clean flat leaf ...	10s a 16s
	,, wiry Mozambique	10s a 11s
PEPPER (Black) lb.		
Alleppee & Tellicherry	Fair to bold heavy ..	5⅜d a 5½d
Singapore ..	Fair	5½d a 5 9-16d
Acheen & W. C. Penang	Dull to fine	4¼d a 5¼d
PLUMBAGO, lump cwt.	Fair to fine bright bold	64s a 72s
	Middling to good small	25s a 50s
chips ,,	Dull to fine bright ..	23s a 57s 6d
dust ,,	Ordinary to fine bright	12s a 35s
SAFFLOWER ,,	Good to fine pinky ..	60s a 65s
	Middling to fair ...	60s a 65s
	Inferior and pickings	40s a 57s 6d
SANDAL WOOD—		
Bombay, Logs ton.	Fair to fine flavour ..	£20 a £35
Chips ,,	... ...	5s a £8
Madras, Logs ,,	Fair to good flavour ..	£20 a £50
Chips ,,	Inferior to fine ...	£4 a £8
SAPANWOOD Bombay ,,	Lean to good ..	£4 a £5
Madras ,,	Good average ..	£4 a £5 nom
Manila ,,	Rough & rooty to good	£4 10s a £5 15s
Siam ,,	bold smooth ..	£6 a £7
SEEDLAC cwt.	Ord. dusty to gd. soluble	55s a 60s
SENNA, Tinnevelly lb	Good to fine bold green	4½d a 6½d
	Fair middling medium	3d a 3¾d
	Common dark and small	2d a 2¼d
SHELLS, M. o'PEARL—		
Bombay cwt.	Bold and A's D's and B's Small ...	£4 a £6 2s 6d
Mussel ,,	Small to bold ..	£1 a £2 17/6
TAMARINDS, Calcutta ..	Mid. to fine bl'k not stony	15s a 16s
per cwt. Madras	Stony and inferior ..	7s 6d a 8s 6d
TORTOISESHELL—		
Zanzibar & Bombay lb.	Small to bold dark mottle part heavy	18s 6d a 23s
TURMERIC, Bengal cwt.	Fair ...	18s
Madras ,,	Finger fair to fine bold bright	25s a 26s 6d
Do. ,,	Bulbs ..	17s
Cochin ,,	Finger .	17s 6d a 18s
	Bulbs ..	8s 6d a 9s
VANILLOES— lb.		
Mauritius and Bourbon 1sts	Gd. crysallized 3½ a 9 in	20s a 29s 6d
2nds	Foxy & reddish 4½ a 8 ,	21s a 25s
Seychelles 3rds	Lean and inferior ...	10s a 14s
VERMILION lb.	Fine, pure, brignt ..	2s 3d a 2s 4d
WAX, Japan, squares cwt	Good white hard ...	30s a 31s

THE

AGRICULTURAL MAGAZINE,

COLOMBO.

Added as a Supplement Monthly to the "TROPICAL AGRICULTURIST."

The following pages include the Contents of the *Agricultural Magazine* for October:—

Vol. XI.] OCTOBER, 1899. [No. 4.

OCCASIONAL NOTES.

THE *Kew Bulletin* for January and February last contains a reference (with plate) of cacao disease in Trinidad. It would appear that the disease is almost entirely confined to the pods, and is caused by two species of fungi, *Phytophthora omnivora* and *Nectria bainii.* The latter is said to be of the same character as the cause of the cacao disease of Ceylon as described by Mr. Carruthers. Mr. Hart of Trinidad is inclined to think that the cacao in Ceylon has a much lower vitality than in Trinidad, and consequently more liable to disease. The pod disease is of course no new thing, but it is said to have been more than usually severe last year, in some districts causing a loss of as much as 50 per cent of crop. The fungus *Nectria bainii* has been so named in complement to Mr. Bain who first called attention to the disease, by Mr. Massey of Kew, and is fully described by the latter.

The Committee of the Colombo Agri-Horticultural Society met on the 19th September, and considered a report made by the Honorary Secretary (Mr. C. Drieberg). Annexed to the report was a statement showing the financial position of the Society, which showed that there was a fairly large balance on hand. No arrangements were made for a Show being held next year, pending the arrival of the Hon. Mr. F. R. Ellis, the permanent Chairman of the Society, though the Committee appeared to favour the idea of holding future Shows annually in the rural districts, and only once in three years or so in the capital.

Mr. Pearson who left Ceylon last year after making scientific investigations in connection with the extraction and preparation of Rubber, is we see appointed assistant (for India) in the Harbarian of the Royal Gardens, Kew, in succession to Dr. Stapf.

We are glad to hear of the success which has attended Mr. Veterinary Surgeon Chinniah's inoculation of cattle against rinderpest on Oodeville Estate, Kandy. We understand that Mr. Chinniah finds pure bile more satisfactory than glycerinated bile as an inoculating medium.

It is reported that the Commission appointed to consider the advisability of establishing a Department of Agriculture are about to recommend that a Board of Agriculture will suffice for present needs, and further that the School of Agriculture should be transferred to Kandy. As a centre where both low and upcountry products could be grown, Kandy is much to be preferred to Colombo as a site for the school, but it is to be hoped that there will be ample scope for practical work, of which there is little opportunity under present conditions, and that the classes will move about the country instead of being confined to one spot.

COLOMBO SCHOOL OF AGRICULTURE.

(From Mr. C. Drieberg's Report to the Director of Public Instruction.)

No changes have taken place in the constitution of the School of Agriculture during the past year. The Commission which was expected to deal with the question of re-organising the Institution did not meet, and the work was carried on the the same lines and under the same conditions as before. With the appointment of another Commission to consider the larger question of organising an Agricultural Department for the Island, it is to be expected that there will be some important changes, whereby the scope of work and the usefulness of the School of Agriculture will be extended.

The importance of Agricultural Shows from an educational point of view is admitted on all hands, and on the occasion in question the promoters took advantage of the opportunity to give practical demonstrations on special subjects, such as budding and grafting, cream separating, &c., which greatly enhanced the importance of the Show as a medium of instruction Agricultural Shows are of rare occurrence in the Island, and the students of the School of Agriculture were singularly fortunate in the fact that the last Show was held at their very doors, and in being so closely associated with the undertaking from which, as an object lesson in their course of instruction, they were able to derive the maximum benefit. I have in my previous reports strongly urged the importance of regularly holding Agricultural Shows, which, had Government seen its way to guarantee a vote against possible losses, might have been held annually. As it was, the last show paid its own expenses, and there was no necessity to draw upon the guarantee which was so liberally made by Mr. Davidson, the Mayor.

As in other years, a large amount of correspondence was gone through in reply to letters received from correspondents in and out of the island, and in consulting others with the object of furthering the agricultural interests of the Colony. As an instance of such an intercommunication I might mention the fact of the opening up of a trade in kekuna oil *(Aleuritis triloba)* to meet the demand that has arisen from abroad for this long-neglected product. I have been working a good deal with other oils so as to bring such merits as they might possess to the notice of the trade, while the question of making plantain flour a marketable commodity has also engaged my attention. On this latter subject I have made two reports to Government. The nurseries of the Rhea or Ramie plant have been practically abandoned, owing to the lack of interest shown by local growers in the fibre industry. The more important introductions in the way of new plants are the Florida velvet bean (*Mucuna pruriens*), highly recommended as a soil renovator (though useful in other ways), a new variety of the sweet potato (the *Nancimum*) and seeds of the early amber sugarcane. My thanks are due to the Director of the Royal Botanic Gardens, Peradeniya, Mr. Williams of Henaratgoda, Mr. John Ferguson, Mr. George Warr of New York, the U.S. Department of Agriculture, Mr. Church of Japan and others, for seeds and plants presented to the school.

The reading room has been well supplied with agricultural papers and reports and the publication of the Agricultural Magazine, which completed its ninth volume in June, 1898, is kept up with regularity.

The second batch of students trained in the Forestry School passed out at the end of February. They are now employed in the Forest Department as follows:—

Mr. Fontyn, Forest Ranger, Kurunegala; Mr. C B Karunaratne, Forest Guard, Hanwella; Mr. B L Mendis, Forest Guard, Hambantota; Mr. M A Fernando, Forest Guard, Passara; Mr. R de Silva, Forest Guard, Kandapola. The first two were drafted from the Department and the others were admitted from the School of Agriculture after a competitive examination. The new class should have begun work in March, but owing to the delay in the arrival of the Forest Officers who were to form the class, regular work did not commence till May. The new class, consisting of Messrs. J S Perera, M B Seneviratne, G Rajapakse, W C Rowlands, W Ferdinands, and D E Tiathonis, was taken on tour by the Conservator of Forests in November and travelled to Kurunegala, from where the Sundapola, Aivandrum, Rukgolla, and Kalugalla forests were visited, and thence to Galboda, Nanuoya, and Haputale.

There is nothing of special importance that I can refer to in the Training School and Practising Schools. The Veterinary classes were kept up by Mr. Sturgess, who reports that Mr. J. E. Fernando was the best student of the year and will have his recommendation for the Government Veterinary Scholarship when it next falls vacant. The Government Dairy has grown since my last report was written; the demand for milk has increased, and additional accommodation had to be provided for the stock. On December 31, 1898, the entire dairy herd consisted of 81 cows, 94 calves, three stud bulls, and four draught animals. It will be observed that we have a large number of young stock on hand, many of them half-grown animals, which take up a good deal of room. On the recommendation of the Colonial Veterinary Surgeon, Government have decided not to sell such young stock which the dairy can spare, in Colombo, but to send them to the Provinces to be sold by the Revenue Officers, where it is expected they will come under the notice of the smaller native landowners and cattlekeepers, by whom they will be purchased. The object of the new arrangement is a good one, but it is doubtful whether it will be attained in practice. For one thing the dairy will not be a gainer by the sales being conducted in the Provinces instead of in Colombo, where there is naturally more competition at the sales. Again, the wealthier landowners of the Provinces, who have hitherto had to purchase our stock in Colombo, would under the new arrangements be able to secure the animals at lower rates owing to comparative absence of competition; while few, if any, of the small landowners who are expected to purchase the cattle can afford the expense of keeping young stock for a year or two till they can be made use of. But even if purchased by such people, the animals would probably be allowed to lead the vagrant life of village cattle, with the result that the ultimate object of the scheme will be frustrated. It would be a better plan for the Kachcheries to own the animals, which should be placed in charge of headmen, so that the animals may be well cared for, and the villagers permitted to make use of them at nominal rates, if not free of charge. So far no young stock has been sold in

the Provinces, as owing to the prevalence of cattle plague in the Kurunegala District, where the first lot of animals was to have been sold, the Government Agent did not think it advisable that any of our stock should be sent to him. The dairy was free from any epizootic disease, though rinderpest prevailed more than once in Colombo, and even in the immediate vicinity of the dairy. This I attribute to the careful measures adopted during times of disease. At such seasons our stock were confined within the "ring fence" area, and the buildings and premises kept thoroughly disinfected. These precautionary measures entailed some expense in the matter of disinfection and extra provision for feeding the dry cows and young stock that at other times are to a great extent kept on the pasturage of the Havelock racecourse (rented by the dairy for R60 per mensem as pasture ground for the stock), but the money is, I think, well spent. During the year there was but one suspected case of rinderpest at the time when the disease prevailed among the Turf Club draught bulls a few hundred yards from the dairy. At the first indication of illness the animal was removed to the quarantine shed, and on the symptoms becoming aggravated it was decided to destroy it. This was done and the carcase buried deep with lime. There were only six deaths during the year, two among the cows and four among the calves.

On March 8th a batch of 31 cows (with 14 calves) and a bull came over from Sinde, having been imported at a cost of R3,310·17, while 20 cows, 16 calves and one bull were sold on the 4th March and brought in, after deducting all incidental expenses of the sale, R1,358·85. The total quantity of milk supplied was 136,405 pints, of which 111,225 pints were produced in the dairy. The largest quantity produced in any one month was 9,000 bottles in July, when the dairy met the whole demand. The revenue of the Model Farm after deducting expenses and the annual rent of R1,350, aggregated R3,281·61. The Farm is a much-frequented resort since the opening of the golf links and the clearing of the low jungle by the Golf Club. The grass lands attached to the dairy were, as before, worked departmentally as an annexé of the Dairy Farm, with satisfactory results.

To briefly state the financial history of the dairy: Government voted a sum of R19,539·12 in 1893 (the year in which the dairy was established) for building, stock, utensils, &c. In 1894 an advance of R11,500 more was made for working the dairy. The latter sum was repaid in 1895, while of the original capital voted (R19,539·12) R8,890·51 had previously been repaid to the Treasury. This left R10,648·61 as the balance due on capital cost. At the end of 1898 the balance of cash in hand or due to the dairy was R9,604·29, so that with stock in trade to the value of R15,000 it will be admitted that the dairy is in a very solvent condition. I would even add to the assets a further sum of R4,400 paid as compensation to the late lessee of the Model Farm, when the property came into the possession of the dairy, as this sum should without difficulty be recovered from any future lessee. The income from the Farm has more than doubled since 1893 when it was acquired; and who would not be willing to invest R4,400 to secure an income (after deducting rent and other expenses) of over R3,000 per annum? So that the former sum might reasonably be put down as a "debt receivable" and the present assets of the dairy increased from R13,955·68 to R18,355·68.

C. Drieberg, Superintendent.

OBSERVATIONS ON AGRICULTURAL EDUCATION IN CEYLON.

(Concluded.)

I have tried to ascertain the views of some of the leading native agriculturists of the island, and from all that I could gather, they expected that the Agricultural School would carry out experiments on the various products tried on a small scale at the school itself and on a large scale outside, with a view to showing how economic products could be cultivated on a commercial scale. But this, I think, was too much to expect from a school which was commenced in such a humble way. There is a great deal for it to do before venturing upon such speculative enterprises. The Director of the Royal Botanic Gardens has already set to work in this direction, and we have had valuable reports of his experiments in the cultivation of Para-rubber. Other products will, it is to be hoped, also receive due attention in time. The students of the school ought to be given an opportunity of acquainting themselves with the nature of such experiments, and to this end should be taken on tour at stated periods during the year and not kept confined to Colombo alone.

The improvement of native agriculture is so directly connected with the education of the people, that I do not think it would be wise to sever the School of Agriculture with the department of Public Instruction.

The Sinhalese villager is, as a rule, not over-industrious. There are a great many products that he can grow in his garden if he will only take the trouble to do so, and learn how to grow them. He will allow the jungle to grow up to the very door of his house, whereas if he will clear it and plant something useful it will add a charm to his dwelling, while at the same time he will reap the produce which he can himself use or sell and procure the means of securing additional home comforts. Pepper, different kinds of yams, betel, onion, ginger, turmeric, chillies, cocoa, a few medicinal, foliage and flower plants, some vegetables, &c., are what should be seen around the dwelling of every villager, in place of weeds and filth as is more often the case. Now and again we find an industrious villager grow some of these products near his house, but it often happens that his neighbours help themselves to the produce. If such cultivation as I have referred be more generally adopted, I am inclined to think that there will be less thieving and generally less crime also in the villages. Betel and ginger may be said to be necessaries of daily life in the villages; the former for masticating, the latter for use in curries and as a remedy for almost every little ailment. A common complaint of the villager is that he cannot grow anything near his house because his cattle destroy or consume it. This raises another question which requires attention. The neglect of village cattle is a notorious fact, and a more rational system of cattle-keeping is much to be desired. If the cattle are looked after as they should be the crops will not suffer. Another thing which the villager must be taught is the value of cattle

manure which is generally allowed to run to waste and often becomes a serious nuisance. In garden cultivation this manure will be of the greatest value. If the younger members of the family could be induced to take an interest in gardening, I anticipate a great improvement in the character of the future men of the villages.

I have stated so much in order to point out in what direction we should work for improvements in native agriculture. How easy will it be to bring about reforms in this line if all our Mudaliyars and Ratemahatmeyas are trained agriculturists. They will then have model gardens round their walauwas and could exercise their influence among the villagers in distributing the various products that are useful to the people and showing them how, and encouraging them to grow them. The experimental garden that I have started in my own property in Kandy with the view of helping the teachers in my district is, I am glad to say, already beginning to bear fruit. I have put almost every bit of it into some use and various products are grown with success. Some of the teachers who have visited the garden have taken a lesson from me, and are trying to establish similar gardens in connection with their schools. The most prominent school gardens so far as I can remember just now are those at We-onda, Morape and Pannela. I am particularly pleased with the garden of the We-onda teacher. My time is so much taken up with examination work that I do not find sufficient opportunity of attending to agricultural work of this nature. School teachers must be taught in the first place, as most of them are as ignorant as the villagers themselves on those matters.

Ceylon in my humble opinion is not yet ripe for an Agricultural Department on as elaborate a scheme like those which are at work in America, Australia, &c. Let the Government by all means appoint a consulting entomologist, and if funds are available an agricultural chemist too. Their services can be profitably utilised in connection with the Agricultural School also, and should add much dignity to that institution. A reorganised Agricultural School in conjunction with the Royal Botanic Gardens as at present constituted are amply sufficient to effect the necessary improvement in native agriculture.

I could submit the following recommendations in this connection :—

1. The School of Agriculture should remain under the control of the Director of Public Instruction. A few gentlemen should be appointed as an Advisory Board, which should consist of the Director of the Royal Botanic Gardens, Scientific experts, Government officials and leading cultivators.

2. The school should be allowed to remain where it is at present, for various reasons, and with the Government dairy attached to it. There is every prospect of reviving the old Normal School also in the same place. The students, however, should be taken to different parts of the island at stated periods during the year with the view of giving them lessons in Practical Agriculture on a large scale, as may be illustrated by such experimental gardens as may be established or shown in actual cultivation on a commercial scale. The period of training should extend over three years.

3. The Syllabus of Instruction should be revised, and the services of a really competent Practical Instructor trained at the Saidapet Agricultural College at Madras should be engaged. Mr. Jayewardene, the late Practical Instructor, who had received only a year's training at the Saidapet College, proved to be an acquisition to the school, and since he resigned his post the want of a good instructor has been much keenly felt. There are a great many things that the Ceylonese can learn from the Indian Agriculturist. A man trained at Saidapet College is just what is wanted here. His salary may begin with R150 a year and rise by annual increments to R200. The present Practical Instructor is an old boy of the school, and he can be easily provided with a place elsewhere. The Syllabus may be revised to include the following subjects only :—

1. English language, such as Reading and Essay writing.
2. Theoretical and Practical Agriculture.
3. Chemistry, Botany and Geology.
4. Veterinary Science and Entomology.
5. Dairy farming including cattle management, butter-making, &c.
6. Elementry surveying.
7. Arithmetic and Book-keeping.

4. The Superintendent will be directly responsible for the working of the School. His time will be fully taken up with the general management of the school, dairy, &c.; he must be provided with a competent staff of teachers to assist him in the teaching of Science, &c.

5. Provision must be made to allow both the Superintendent and the Instructor to travel about in the country with a view to studying its agricultural requirements.

6. In every district which is in charge of a Mudaliyar or a Ratemhatmeya there are a certain number of Government Schools over which they exercise some supervision. Each school should be provided with an acre of land, and the school bungalow should, if possible, stand on it. This land should be laid out and planted in such a way as to serve as a model for the boys to copy.

7. Every boy attending school should be encouraged to have his own little garden near his house, the plants to be grown there should be supplied to him from the school garden. These gardens should be periodically visited by the teacher or the Agricultural Instructor.

8. Prizes should be offered to the best-kept garden and small annual Agricultural Shows held in connetion with schools; at which the boys must exhibit the products from their own garden. The prizes offered need not be expensive ; books, slates, paper, pencils, &c. will be sufficient to begin with, and such prizes will be much appreciated by the boys. A separate vote should be allowed by Government to meet the expenses of prizes, &c.

9. These Agricultural Shows should be gradually extended, so that others, besides school boys, may exhibit and compete for prizes. A fresh impetus will thus be given to village school education.

10. The Mudaliyar or the Ratemahatmya must take a leading part in organising village Shows.

11. Theoretical agriculture is at present taught in every village Government School from the Fifth Standard upwards. It is important that some competent man should teach this subject. In addition to his routine work such a man could arrange to give popular lectures in Agriculture and allied Sciences. Such lectures should be carefully prepared so that they may be interesting, instructive, and entertaining to the villagers.

12. A competent Agricultural Instructor should be appointed to take charge of the agricultural education of each district, and he must work on the lines indicated above. His work should be constantly supervised by somebody from the Parent School.

13. Every Mudaliyar and Ratemahatmeya should in future be required to pass an examination in Agricultural Science. This should be made one of the qualifications for appointment to such posts. When the Agricultural School is re-organised and a competent staff appointed such as will command the confidence of the public, there is no reason why some of the younger Mudaliyars and Ratemahatmeyas should not be asked to go through a course of study in it and obtain diplomas.

14. The village Agricultural Instructor should also be the village Veterinary Surgeon. He should teach the people how to tend cattle. They must be induced to grow fodder for their cows and attend to the sanitation of their dwellings.

THE ANNATTO DYE OF COMMERCE.

The oldest book on the agricultural products of tropical countries that I have come across is by George Richardson Porter published in 1833. Cacao is there described as the chocolate tree of Mexico, but no mention whatever is made of annatto. Evidently this new product was then unknown to be of a commercial value. Its use in the preparation of cacao for the table by the Spanish seems to have first brought it to the notice of the other nations of Europe and put into different other uses. This might possibly have been in the middle of the present century. But in Ceylon no attention seems to have been attracted by the plant, although it was found to be growing almost wild—if not cultivated as an ornamental tree or merely as a fence or hedge-row—until the year 1880, when Eliot James' *Indian Industries* appeared in print, the coffee enterprize was coming to an end, and planters began to turn their attention to other products. It was the late Mr. George Wall and his friend the late Mr. A. G. K. Borron that made the first attempt to include annatto amongst other new products cultivated on their partly-abandoned estates Ankanda and Crystal Hill in Matale East; and the first crop from these trees was the first parcel of annatto seed exported from the island when the price paid for West Indian seed in London was 5d. to 6d. per lb. But the employment of Tamil labor, and the process in which this crop was harvested was so expensive—not to speak of freight and other incidental charges—it was found that in the long run annatto sent to Europe in seed would not pay. It is interesting in this connection to notice what the late Director of the Royal Botanical Gardens wrote in his report for the year 1881. Under the heading *annatto* there is a long paragraph with this sentence in his own words:—

"Several gentlemen have made inquiries as to "the mode in which this is prepared for the "market; and as I could find no very definite "published account, I applied to the authorities "at the Royal Gardens, Kew, for information." The gentlemen referred to were evidently those who were disappointed at the result of their exports to London; and in future, instead of shipping the seed, intended to convert their crops into the manufactured dye, by which means not only a saving of 20% was expected to be made in the freight, but also keep pace with the other countries that sent the article to the market. The information obtained through Dr. Trimen's efforts given in the report were however not of much value; and if anybody had succeeded in producing a marketable simple of the dye in the island subsequently, it was the late Mr. Borron. The writer who was then his assistant need not dilate on the subject here. Their united exertions in this respect is well known to those who are interested in that line of business. It may however be remarked that before the development of anything like a paying business which required time and more capital, it was very fortunate for the planters that Sinhalese labor should have at that time become very plentiful and cheap in the country. Hitherto it was only the adult male that sought employment on estates as coolies, whilst his family remained in the village tending to their cattle and their small coffee gardens. The coffee leaf disease came on and destroyed these village gardens, and starvation stared in the face of those who depended on them for their support. Hence scores of Sinhalese women and children became only too happy if they could have got any work to do on the neighbouring estates, and were willing to do it for merely a day's meal. The first European capitalist who employed this cheap labor was Mr. Borron to harvest the crop of annatto on Crystal Hill in July, 1884. Then followed a revolution in the annatto trade, and the writer had the satisfaction of seeing that (instead of worrying his head to discover the secrets of manufacturing the dye) he was able to place the seed itself on board the ship at Colombo at a cost of 6 cents per lb. against 20-25 cents a lb. it had cost before. Encouraged by this success large areas of abandoned coffee lands were immediately brought under cultivation in the Matale district. Others followed suit, and in a couple of years later there sprang up flourishing fields of annatto in Wattagama, Kurunegala, Kadugannawa, Gampola, and even far away in the Kelani Valley and Badulla districts. Even the villagers introduced it into their gardens and gave the Moorish boutique-keepers another commodity to their petty trade. In fact, it was an Assistant Government Agent who told his immediate superior that this new product would be the salvation of the natives, and got a monograph treating on its cultivation published in Sinhalese. There was one person, Dr. Trimen, who stood against these widespread extensions; these were

his words written in the report already mentioned: "The trade in annatto is a limited one. It is used "as a dye occasionally, but its principal employ-"ment is for colouring cheese and butter." But this timely warning was disregarded, and no wonder that when at last this "annato craze" had reached the climax, a reaction should have set in, and over-production should have brought down prices in the home market. The following are the words, one in the trade (Messrs. R. J. Fullwood and Bland of 61, Bevenden St., Hoxton, N.) wrote at the time: "The Ceylon people made a great mistake "in 1888, in sending *one* consignment of 150 "barrels; the consequence of so large a quantity "being thrown in the market was, that they were "sold for less than cost of freight, dock charges, "&c." *vide Kew Bulletin*, July 1890, p 143.

Then followed what was quite natural, namely, the wholesale destruction of the annatto trees on most of the European estates and the lands put under tea or cacao. It was very fortunate for those who had resorted to this bold alternative; for, by the time these tea fields commenced to bring in handsome returns, and the cacao come into bearing, annatto, wherever it was still allowed to stand began to show indications of exhaustion and decay; and the fact was then found out that it was a permanent tree. Its natural limit was to grow for seven or eight years, and then die off. If it stands longer, it will be after it had ceased to bear fruit. This is the opinion of your humble servant the writer, whose practical experience in growing this product extends to a period of fifteen years. Opposed to this, instances might be pointed out where the trees have been known to be growing for a longer time, but they are only isolated cases—exceptions, not the rule.

In my next I shall dwell upon the cultivation and diseases incident to this product, with some other notes as may be interesting to the readers of your popular Magazine.

A. VAN STARREX.

VETERINARY NOTES.

The Age for Castrating Domestic Animals.

The question when an animal should be castrated has often been asked. In cases of surgical interference, necessitated by pathalogical changes in the glands, no age has got to be observed excepting the fitness of the system in general to stand the effects of an operation. But in ordinary instances of castrating farm or domestic animals either with a view of fattening them, preventing the propagation of weeds, or checking vice, &c., the earlier the animal undergoes the operation the better. Any time after the development of the gland has taken place and before the animal is half-grown the operation must be performed. For example, a horse is full grown at six years and the gland is developed at one year; and so the best age for castration is between one and three years in the colt. When an animal is castrated early, his tissues being young and healthy, help to bring about a healthy termination of the operation within a short time, and at this period of the animal's life feel there is less chance of the animal's death from shock unless he is allowed to bleed severely.

A Case of Tetanus due to the Syce Replacing a Broken Nail of the Shoes.

In answer to a call I proceeded to see an animal belonging to Dr. Muttucumara, who told me that the horse limped badly, but as it was dark, I was not able to examine the animal well. I told the ower that the lameness was either due to some injury to the foot or to splints. On examining the foot later nothing was noticeable, and when the horsekeeper was questioned whether he removed auy nail from the hoof he denied flatly. On the third day I received a message that the animal felt pain at the fetlock. On examination, found that the horse flinched when the inferior suspensary liganut was pressed, and accordingly the region of the liganut was blistered. The following morning the animal showed symptoms of tetanus and succumbed. On postmortem a nail was found to have penetrated the sensitive hoof at the outside quarter. It was only after the death of the animal that the horsekeeper admitted his interference.

Tracheotomy in a Case of Roaring.

A case was brought to me with the history that the animal emitted a loud sound while galloping and that he was unable to breathe freely when driven for a short distance. I saw the animal trotted and found that he was a roarer. I suggested tracheotomy as the only means of enabling the animal to prolong his life. The owner (Mr. Babapillai) consented and the operation was performed standing, on the 25th of May last. The horse is being worked since the 15th day after the operation. The tube was devised and made to my order, and a gauze shutter was also devised to prevent exposure of the wind pipe to chill and also to prevent dust &c. falling into it.

PRESERVATION OF EGGS.

The appended report has been sent us of trials made at the Central Experimental Farm, Ottawa, Canada, of the two best reputed methods of preserving eggs, viz:—Solution of water glass, (silicate of soda), and lime-water. Out of twenty different materials and plans which were tried, only three of which were found to be effective and reported "all good." These were varnishing with vaseline, lime-water, and water glass, and we fiud that the last two were found effective at Ottawa:—

Central Experimental Farm,
Ottawa, May 19th, 1899.

Sir,—Having received numerous inquiries from farmers during the past two months respecting the merits of "water glass" as a medium in which to keep eggs, we are led to think that certain conclusions drawn from an experiment, lately brought to a close, with this and other preservatives will be of interest to your readers. The investigation was commenced last September, perfectly fresh eggs from the Farm poultry house

being used for the test, which consisted in immersing the eggs for varying lengths of time, from a few hours to six months, in (*a*) lime-water, and (*b*) 10 per cent solution of "water glass." Those eggs which were treated for a few hours, days or weeks, as the case might be, were subsequently placed, together with the untreated eggs to be used as a check, in a rack within a drawer in the laboratory till the close of the experiment, March 30th, 1899. All the eggs were at a temperature from 65° to 72° F. throughout the trial. The testing consisted in breaking the eggs into a glass and noting the appearance of the 'white' and yolk, whether the yolk was stuck to the shell, size of air-space, odour, &c. The eggs were then poached and again the odour, appearance, &c. noted. Without giving in detail the results of the various trials, it may suffice for the present purposes to summarize the conclusions reached, as follows:—

CONCLUSIONS.

1. In no instance, either of treated or untreated eggs, were any 'bad' eggs found.

2. In all cases where the eggs were not kept covered throughout the period of the test with the preservative solution, shrinkage of the contents had taken place, as shown by the larger air-space, less globular form of the yolk, and in many instances by the adherence of the yolk to the shell. The eggs treated for seven days and less with lime-water showed somewhat less shrinkage than those treated a similar length of time with silicate of soda.

3. It would appear that lime-water and 'water-glass' used continuously are equally efficacious in preventing shrinkage. They may also be said to give practically the same results as regards both external and internal appearances, flavour, &c. of the eggs preserved. Since 'water glass' (silicate of soda) is more costly and more disagreeable to use than lime-water, we could not from the present results recommend the former as the better preservative.

4. The albumen or 'white' in all the preserved eggs was very faintly yellow (though not to the same degree in all the eggs), the tint becoming deeper on boiling.

5. No offensive odour was to be perceived from any of the eggs when broken, but in all instances a faint but peculiar musty or slate odour and flavour developed on poaching.

6. It is probable that no preservative will prevent the loss of flavour possessed by the fresh egg, but those which wholly exclude the air (and thus at the same time prevent shrinkage from evaporation) will be the most successful. Continual submergence is evidently better than treatment for a few days. The lime-water may be made by putting two or three pounds of good fresh lime in five gallons of water, stirring well at intervals, for a few hours and then allowed to settle. The clear supernatant fluid can then be poured over the eggs, which have been previously placed in a crock or water-tight barrel.

Some authorities recommend the addition of a pound or so of salt to the lime-water, but the writers are of the opinion that this is unnecessary, and probably leads to the imparting of a limy flavour to the eggs by inducing an interchange of the fluids within and without the egg. The all essential points to be remembered are:—(1) That the eggs to be preserved shall be perfectly fresh, and (2) that they shall be covered with the preservative fluid.

FRANK T. SHUTT,
Chemist, Dom. Expt. Farm.
A. G. GILBERT,
Poultry Manager, Expt. Farm.

MUSHROOMS.

Mr. Tardent, a frequent contributor to the *Queensland Agricultural Journal,* supplies some useful information regarding mushrooms to the September number of that journal, quoting Mr. A. de Zaczewsky, who is referred to as one of the greatest living authorities on mycology, in saying that "from the most ancient times mushrooms have been considered as an extremely healthy esculent. Modern science has confirmed that opinion. According to analysis made by the greatest authorities known to chemical science, mushrooms are by far the most nutritious of vegetable substances, not excluding bread. The proportion of protein they contain brings them nearer to meat than to plants. In addition, they contain an important proportion of assimilable phosphorus."

In Paris alone over £1,500 worth of mushrooms are being sold *daily.* In Italy and Germany they form an important part of the alimentation of the people. For Russia there are no available statistics, but the writer of these lines can affirm, with Mr. de Zaczewsky, that in certain localities the people live nearly exclusively on mushrooms, especially at the time of the heaviest outdoor work.

The only drawbacks to the use of mushrooms are the cases of poisoning which occur nearly every year. According to Mr. de Zaczewsky, there are absolutely no empiric means of ascertaining the true nature of mushrooms. Neither the shape, nor the colour, nor the smell or flavour can be taken as a sure indication. Of course it is pure superstition to believe with some ignorant people that those mushrooms are poisonous which grow near a snake-hole, or close to a rusty nail, a mouldy piece of cloth, or a poisonous plant. Neither is it true that we can eat safely mushrooms which have been gnawed by insects. There are snails and insects capable of eating with impunity mushrooms which are highly poisonous to man. Even cows can eat varieties which it would not be safe for man to touch. But dogs, cats, and rats are affected similarly to human beings, and we can safely try on them suspicious varieties. Another groundless prejudice is to believe that if a silver coin or spoon or an onion become blackened by being put in the water in which mushrooms have been boiled, it is a sign of poison. It is not a poisonous substance which thus darkens those objects, but the presence of sulphur, which combines with other elements, forming thus sulphydric acid. Onions or silver boiled with eggs will become dark, too. Still, nobody would say that it is because eggs are poisonous.

As to the effects produced on our system by poisonous mushrooms, they are of two kinds,

Some varieties, as the *Russules*, act directly on the digestive organs, causing there an acute inflammation ordinarily from two to three hours after they have been eaten. These are very seldom fatal. An emetic such as ipecacuanha, or, still better, 15 grammes of emetic mixed with 30 grammes of sulphate of soda in a glass of water, to be taken in two draughts at intervals of five minutes, will be sufficient to free the stomach and save the patient.

Other varieties, such as some of the *Amanitæ*, are far more dangerous. Their poisonous principle is a narcotic, acting, not on the digestive organs, but directly on the nervous system. The effect takes place from six to forty-eight hours after eating the mushrooms, when the poison has all passed into the blood. It first causes headache, confusion of ideas, dejection, and stupor. Then follow nausea, vomiting, palpitations, acute abdominal pains, oppression, and intense thirst. The face is pale and panged; convulsions, delirium, and fantastic visions bring the patient into a comatous state. That condition, which is accompanied by intense pains all over the body, may continue for many days. But the result is nearly always fatal. Large draughts of strong tea or coffee are used to counteract the prostration. When the stomach is entirely free from the poisonous substance, then use ether and ammonia to prevent nervous accidents. Should the patient recover, he remains for a long time very weak, and the greatest care and precautions are to be used during his convalescence.

Such a terrible possibility as the above described should, it seems, be sufficient to deter anyone from eating mushrooms. Fortunately there is, according to Mr. de Zaczewsky, a perfectly safe means of eating with impunity even the most poisonous of mushrooms. It was discovered many years ago by Mr. Gerard, assistant botanist of the Jardin des Plantes in Paris. In the presence of a commission appointed for the purpose by the Academie des Sciences, he ate, and every member of his family did the same, some of the most poisonous varieties. The experiment was so conclusive that the members of the commission joined in the feast, and enjoyed with impunity some of the deadliest varieties of the *Amanitæ*.

The recipe is simplicity itself. Copy it, and paste it in a conspicuous place.

For every pound of mushrooms cut into pieces, take 1 quart of water, add to it 2 or 3 spoonfuls of vinegar or of salt. Soak the mushrooms in this for two hours. Then strain off the water and throw it away, as it contains all the poisonous principle of the mushrooms. Rinse the mushrooms well and boil in water for a quarter of an hour. Wash them in hot water and prepare in the usual way.

GENERAL ITEMS.

Mr. D. H. Maury, engineer and superintendent of the Peoria Waterworks Company, Illinois (U.S.A.), writes as follows to *Engineering News*:—In your issue of 11th May, I note an abstract from a paper read by Mr. Ernest R. Woakes, before the American Institute of Mining Engineers, the item quoted relating to the necessity in the tropics of felling timber during the waning moon. I can entirely corroborate Mr. Woakes's statements in this connection, and I am all the more glad to do so because he is an old friend, as I happened to be for several years engaged in engineering work near him in Columbia, South America. It was an absolutely invariable rule there that all timber should be felled in *menguante*, or during the waning of the moon. The *creciente*, or the periods of the moon's increase, was employed in sawing the felled timber, all work having to be done by hand with a pitsaw. I have repeatedly tested the effect of the tropical moon on timber. On one occasion, in building a fence of the native bamboo, I had all the bamboo cut from the same thicket, and felled it all, except enough for one panel, during the waning moon. This one panel, which was cut while the moon was waxing, turned black in a few days, and had begun to rot in less than six weeks. The rest of the fence grew white and hard, and was in perfect condition when last I saw it, some three years after it was built. In making clearings for mining work, I have frequently noticed the rise and fall of the sap in the stumps of the felled trees, and have observed the sap to continue during each *creciente* to run out of the pores on the top of the stump down the sides of the stump for several months after the tree had been felled. During *menguante*, the same stump would be dry.

A writer in the *Australian Pastoralist's Review* says:—As I am a firm believer in the efficacy of the divining rod, your article on it in the *Review* of the 15th instant attracted my attention, as it should that of all who have to do with sinking for water in dry country. Sceptics may scoff, and unbelievers laugh as they like, but I assert there is a virtue in the divining rod; that it will indicate where underground streams are flowing, and that with certainty and accuracy when used by a person in whose system there is more than the average amount of electricity. The person holding the rod is, as it were, the battery, and, by holding the rod (I use a copper wire bent in a semicircle) at arm's length with one end of the rod towards him, will continue to attract it until he passes over something possessing a greater power of attraction than his body. If you hold the rod so tightly in your hand that it cannot twist round, it will rise up fully 45 per cent. if the subtle power arising from the earth be fairly strong. Upon one occasion, when experimenting with the rod in the south-west of South Australia, it rose to perpendicular, and then dipped slightly from me. When you have passed beyond the greater attraction than is possessed by the "diviner," the point of the rod will turn towards the holder. I have found the rod work better in summer than winter—sultry weather for choice.

Says an *Exchange*:—There are four items which every owner of cows should constantly remember. The first is to keep a record of the milk production of each cow for a year (if he can record the butter yield and cost of food for each, so much the better). The second point is to prevent the production of horns on his young cattle by

removing the hair around the "bosses" where the horns would be produced, then damp lightly with water, and rub only on the bosses with lunar caustic until the skin appears inflamed—about two or three minutes. The third point is to remember that a tablespoonful of carbonate of soda in a winebottle of water, if administered to an animal which has eaten grain, lucerne, clover, or other food causing it to be "blown" (otherwise called "tympanitis," or "hoven," or "blast") will at once remedy the evil. Lastly, when a cow is attacked with "milk fever" after calving, the best remedy is to give her at intervals of three hours two doses of brandy and water—about half-a-bottle at each time—and keep the bowels open.

A writer in an American sporting journal gives the following rule to estimate the height a colt will grow to:—Take a colt at any time between six weeks old and one year; stand him on a level surface, so that he will stand naturally, then measure the distance from the hair of the hoof to his knee-joint, and for every inch, or fraction thereof, he will be hands high when matured. If he measures 15 inches he will grow to be 15 hands high; if 15½ inches he will be 15½ hands high; and so on.

The remedy for soft butter is as economical as simple. Purchase an 8 or 10 inch common, unglazed flowerpot. Wash thoroughly in clear water, then let it stand for an hour submerged in as cold well-water as can be procured. When saturated, drain a few minutes by turning the pot upside down. Prepare your butter on a plate a few hours before meal-time. Fit a cork into the hole in bottom of the pot to exclude all hot air.

Try this remedy for warts: Saturate the warts every few days with pure castor oil and they will disappear, leaving the surface as smooth as though they were never there. We have known of several cases where warts were removed from the nose of colts by simply rubbing them with lard occasionally.